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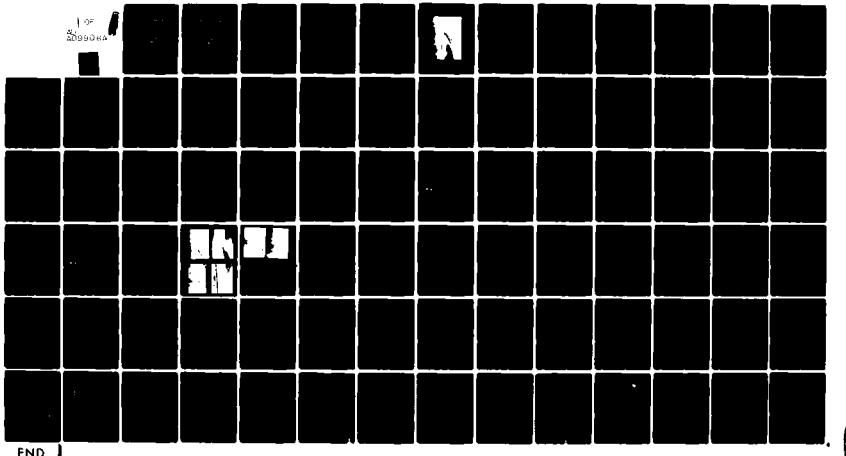

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SUSQUEHANNA RIVER BASIN

KINGS CREEK, SULLIVAN COUNTY

PENNSYLVANIA

ROSCOE BURGESS DAM

NDI ID NO. PA-357

DER ID NO. 57-37

ROSCOE BURGESS

PHASE I INSPECTION REPORT

Prepared By

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG, PENNSYLVANIA
15931

FOR

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT CORPS OF ENGINEERS
BALTIMORE, MARYLAND
21203

APRIL, 1981

SUSQUEHANNA RIVER BASIN

KINGS CREEK, SULLIVAN COUNTY

(1 PENNSYLVANIA

National Dam Inspection Report.

ROSCOE BURGESS DAM

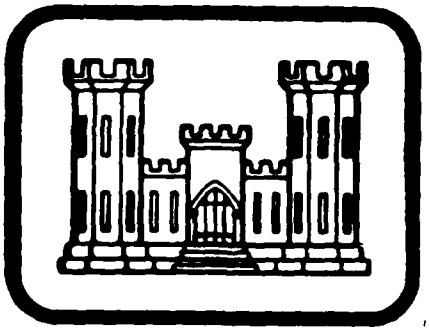
(NDI ID Number PA-357

DER ID Number 57-37)

Susquehanna River Basin, Kings Creek, Sullivan County, Pennsylvania.

ROSCOE BURGESS

PHASE I INSPECTION REPORT,



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21203

(11) APRIL 1981

411059

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in detemining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM INSPECTION REPORT

NAME OF DAM	Roscoe Burgess Dam
STATE LOCATED	Pennsylvania
COUNTY LOCATED	Sullivan
STREAM	Kings Creek
DATES OF INSPECTION	October 22, 1980
COORDINATES	Lat: 41° 34.2' Long: 76° 37.1'

ASSESSMENT

The assessment of the Roscoe Burgess Dam is based upon visua.. observations made at the time of inspection, review of available records and data, hydraulic and hydrologic computations and past operational performance.

The Roscoe Burgess Dam appears to be in fair condition. Maintenance of the dam is fair. The brush and small trees on the downstream slope and toe area of the structure should be removed. No drainline exists at the dam, which is considered a deficiency.

The Roscoe Burgess Dam is a high hazard-small size dam. The recommended spillway design flood (SDF) for a dam of this size and classification is in the range of 1/2 PMF to PMF. Based on the downstream potential for loss of life and property damage, the spillway design flood has been selected as the PMF. The spillway and reservoir are capable of controlling approximately 25% of the PMF without overtopping the embankment low spot. Based on criteria established by the Corps of Engineers, the spillway is termed inadequate, but not seriously inadequate.

The following recommendations and remedial measures should be instituted immediately.

1. A detailed hydrologic and hydraulic analysis should be conducted by a registered professional engineer knowledgeable in dam design and construction to increase the spillway capacity.

2. The brush and small trees on the downstream slope of embankment and in the area of the toe should be removed under the direction of a registered professional engineer knowledgeable in dam design and construction to insure that the removal of the vegetation does not seriously affect the stability of the structure.

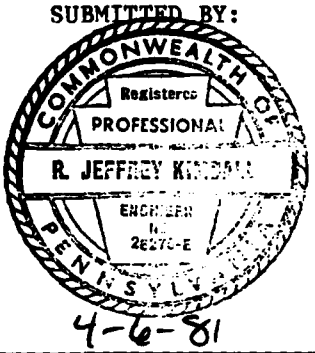
3. No reservoir drain exists for the structure. This is considered a deficiency and some means, with an upstream control, should be provided to drain the reservoir should the need arise to do so.

4. A warning system should be developed to warn downstream residents of imminent failure of the dam.

5. A regularly scheduled maintenance program should be planned and implemented at the dam.

6. A safety inspection program should be implemented with inspections at regular intervals by qualified personnel.

SUBMITTED BY:



4-6-81
Date

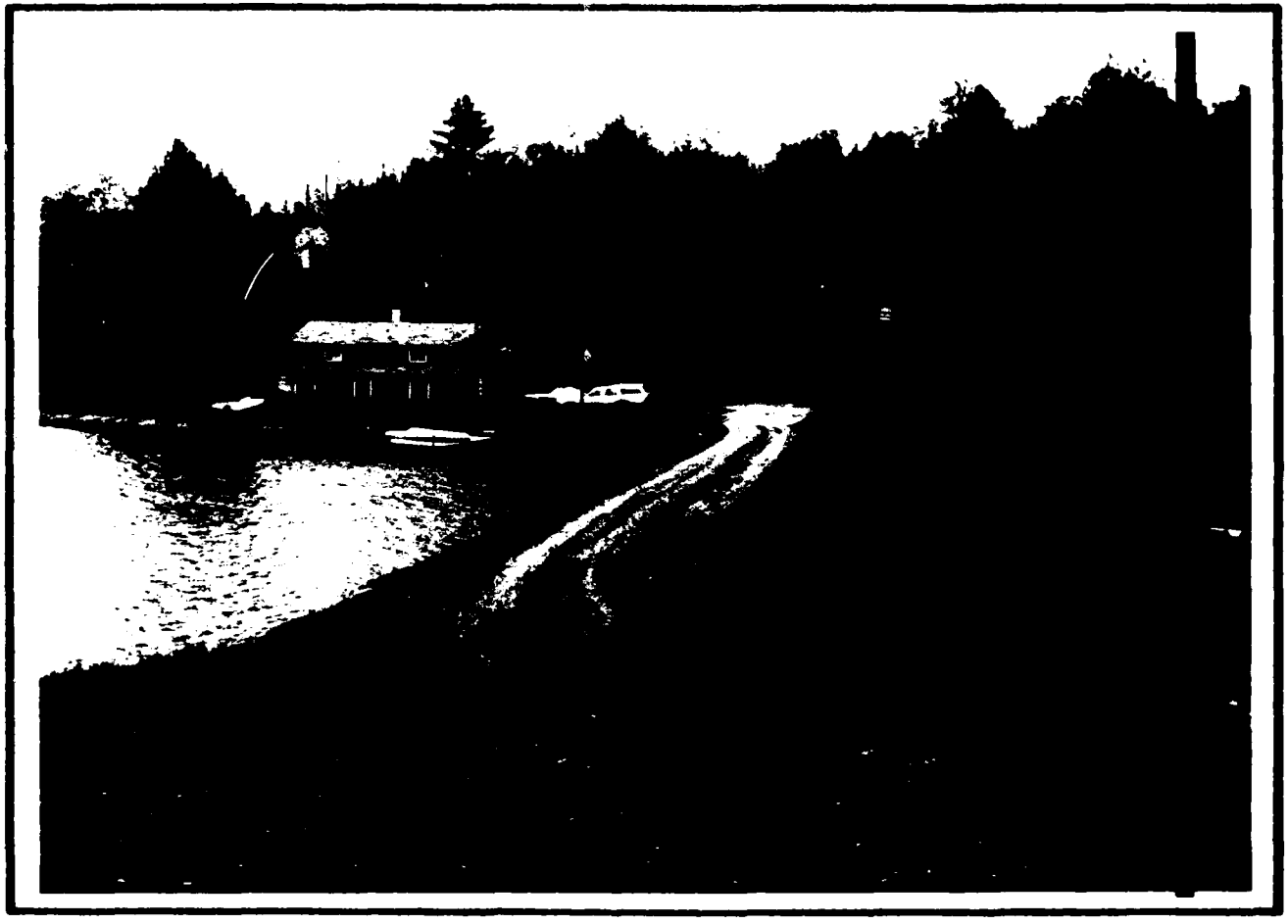
R. Jeffrey Kimball
R. Jeffrey Kimball, P.E.

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS AND ARCHITECTS

APPROVED BY:

21 APR 81
Date

James W. Peck
JAMES W. PECK
Colonel, Corps of Engineers
District Engineer



Overview of Roscoe Burgess Dam.

TABLE OF CONTENTS

APPENDICES

PHASE I
NATIONAL DAM INSPECTION PROGRAM

ROSCOE BURGESS DAM
NDI. I.D. NO. PA 357
DER I.D. NO. 57-37

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. The Roscoe Burgess Dam is an earth-fill dam, 264 feet long and 17 feet high. The crest width of the dam is 12 feet. The upstream and downstream slopes of the dam are 2H:1V. The upstream slope of the dam is protected with riprap, and the downstream slope of the dam is grass covered and contains considerable brush and small trees. A gravel roadway exists across the crest of the dam.

The spillway for the dam is located at the left abutment. The spillway is a rectangular structure with a weir length equal to 31.5 feet. The control section for the spillway consists of a semi-sharp crested weir. A 13 foot long concrete apron with an endsill is beyond the control section. Large boulders are located beyond the end sill and serve to protect the spillway channel from erosion due to discharges from the spillway. A concrete wingwall exists along the right edge of the spillway, and a wooden bridge spans the spillway crest area. The wooden bridge is supported by four wooden columns located near the center of the span.

b. Location. The dam is located on Kings Creek, approximately 4 miles north of the Village of Estella, Elkland Township, Sullivan County, Pennsylvania. The Roscoe Burgess Dam can be located on the Overton, U.S.G.S. 7.5 minute quadrangle.

c. Size Classification. The Roscoe Burgess Dam is a small size dam (17 feet high, 318 acre-feet).

d. Hazard Classification. The Roscoe Burgess Dam is a high hazard dam. Downstream conditions indicate that loss of more than a few lives is probable should the structure fail. The Village of Estella is located approximately 4 miles downstream of the dam.

e. Ownership. The Roscoe Burgess Dam is owned by Mr. Roscoe Burgess. Correspondence should be addressed to:

Mr. Roscoe Burgess
R.D. #1
Forkville, Pennsylvania 18616
717/924-3555

f. Purpose of Dam. The dam is utilized for recreational purposes.

g. Design and Construction History. Based on information contained in the PennDER files, a member of the Fish Commission first located the structure on April 7, 1948. Subsequent correspondence between the Fish Commission and the Water and Power Resources Board indicated that no permit had been issued for the construction of the dam. In April, 1948, Mr. Burgess was contacted by appropriate state officials and was asked to submit plans and other pertinent information to the Board.

Later correspondence in the file indicates that the dam was completed in 1947. The length of the reservoir and embankment were estimated at 1,000 feet and 500 feet, respectively. It was reported at this time that no permit was requested since it was understood that the drainage area was significantly less than 1/2 square mile.

In January, 1949, an application was made by Mr. Burgess requesting that a permit be issued for his dam. The report on the application indicated that the dam was only partially constructed. The structure was to have a total length of 300 feet and a maximum height of 16 feet. During March, 1949, the Department of Forest and Waters received a letter regarding the Roscoe Burgess Dam. It was reported in the letter that the dam had failed and that a considerable amount of property damage had occurred due to the failure. No loss of life was associated with the failure. During April, 1949, the structure was inspected by an engineer from the Water and Resources Board. As a result of the inspection it was suggested that Mr. Burgess retain an engineer to prepare plans for the structure. No information relative to the reported failure was contained in the inspection memorandum. Construction of the present dam was completed late 1951. The engineer who designed the dam was Mr. Jesse S. Ritchey of Wellsboro, Pennsylvania. A construction survey was completed by Mr. Samuel R. Kirkland, a registered surveyor from Laporte, Pennsylvania. Drawings relative to the structure appear in Appendix E of this report. No information relative to the actual construction of the dam was available.

h. Normal Operating Procedures. No operations are conducted at the dam. Normal inflow to the reservoir is maintained at the spillway crest elevation.

1.3 Pertinent Data.

a. Drainage Area. 1.61 square miles

b. Discharge at Dam Site (cfs).

Maximum flood at dam site	Unknown
Spillway capacity at top of dam	1060 cfs

c. Elevation (U.S.G.S. Datum) (feet). - Field survey based on the spillway crest elevation, 1672.0 feet from drawings. See Appendix E, page E-5.

Top of dam - low point	1676.7
Top of dam - design height	1676.0
Pool at time of inspection	1671.5
Spillway crest	1672.0
Maximum pool - design surcharge	Unknown
Normal pool	1672.0
Maximum tailwater	Unknown
Toe of dam	1659.5

d. Reservoir (feet).

Length of maximum pool (PMF)	2700
Length of normal pool	1900

e. Storage (acre-feet).

Normal pool (spillway crest)	105
Top of dam	318

f. Reservoir Surface (acres).

Top of dam	65
Normal pool	28.5
Spillway crest	28.5

g. Dam.

Type	Earthfill
Length (including spillway)	264 feet
Height	17 feet
Top width	12 feet
Side slopes - upstream	2H:1V
- downstream	2H:1V
Zoning	None
Impervious core	None
Cutoff	None
Grout curtain	None

h. Reservoir Drain. (None)

i. Spillway.

Type	Semi-sharp crest
Length	31.5 feet
Crest elevation	1672.0
Upstream channel	Lake (unrestricted)
Downstream channel	Kings Creek

SECTION 2
ENGINEERING DATA

2.1 Design. Review of available information in the files of the Commonwealth of Pennsylvania, Department of Environmental Resources, revealed that some correspondence, permit information, design drawings, and pictures were available for review. Drawings relative to the design of the Roscoe Burgess Dam are located in Appendix E of this report.

2.2 Construction. No information exists regarding the construction of the dam.

2.3 Operation. No operations are conducted at the dam.

2.4 Evaluation.

a. Availability. Engineering data were provided by the PennDER, Bureau of Dams and Waterway Management. The owner of the dam, Mr. Roscoe Burgess, was interviewed to obtain data relative to the dam. Mr. Burgess did not supply any additional information.

b. Adequacy. This Phase I Report is based on the visual inspection and hydrologic and hydraulic analysis. Sufficient information exists to complete a Phase I Report.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. The onsite inspection of the Roscoe Burgess Dam was conducted by personnel of L. Robert Kimball and Associates on October 22, 1980. The inspection consisted of:

1. Visual inspection of the retaining structure, abutments and toe.
2. Examination of the spillway facilities, exposed portion of any outlet works and other appurtenant works.
3. Observations affecting the runoff potential of the drainage basin.
4. Evaluation of the downstream area hazard potential.

b. Dam. The dam appears to be in fair condition. From a brief survey conducted during the inspection, it was noted that the low area on the crest of the dam was located at the right abutment. Riprap was observed on the upstream slope of the structure approximately 2 feet above the waterline at the time of inspection. A roadway was observed to exist across the entire length of the embankment. The downstream slope of the dam was covered with small trees and brush. The brush on the downstream slope hampered attempts at close visual inspection of the slope and toe area.

c. Appurtenant Structures. The spillway for the dam is located at the left abutment of the structure. A wooden bridge was observed which spans the spillway crest. A concrete sidewall is present along the right edge of the spillway. A cutoff wall exists perpendicular to the right spillway channel wall. The control section for the spillway is a semi-sharp crested structure. A concrete stilling basin exists below the control section with an endsill at the downstream end of the stilling basin. Large boulders were observed in the channel immediately below the spillway. The boulders are used to protect the channel immediately below the spillway from erosion. The spillway is a near rectangular section. Four wooden columns exist at the spillway approach and are utilized to support the wooden bridge which spans the spillway crest area. No spillway approach wingwalls were observed at the structure. The spillway appeared to be in fair condition and adequately maintained. No drainline was observed existing at the dam.

d. Reservoir Area. The watershed is covered almost entirely with forested lands. The reservoir slopes are moderate and do not appear to be susceptible to landslides which would affect the storage volume of the reservoir or overtopping of the dam by displacing water.

e. Downstream Channel. The downstream channel for the Roscoe Burgess Dam consists of Kings Creek. The Village of Estella is located approximately 4 miles downstream of the dam. The population of the village is approximately 50 people. Route 154 passes through the Village of Estella and crosses Kings Creek at the Village.

3.2 Evaluation. In general, the dam and appurtenant structures appear to be in fair condition. No major erosion areas were observed during the inspection. No seepage was observed along the downstream slope of the structure or along the toe area. Dense brush exists along the downstream slope of the structure and hampered attempts at close visual inspection of the downstream slope and toe area. The brush and small trees on the downstream slope and in the area of the toe of the dam should be removed under the direction of a registered professional engineer. Once the slope and toe area are cleared, the area should be reinspected to verify that no seepage existed at the structure.

No drainline was observed at the structure. This is considered a deficiency and some means should be provided to drain the reservoir.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures. The reservoir is maintained at the spillway crest elevation. No other procedures are conducted at the dam.

4.2 Maintenance of the Dam. No planned maintenance schedule exists for the dam. Maintenance of the dam is performed by the owner on an unscheduled, as-needed basis. Small trees and brush exist on the downstream slope and toe area of the structure. The small trees and brush should be cleared from the slope and toe area.

4.3 Maintenance of Operating Facilities. No operating facilities exist at the structure. Normal inflow to the reservoir is discharged through the spillway at the left abutment. No erosion was observed at the approach to the spillway.

4.4 Warning System in Effect. There is no warning system in effect to warn downstream residents of imminent failure of the dam.

4.5 Evaluation. Maintenance of the dam is considered fair. Brush and small trees have been allowed to grow on the downstream slope of the structure. The brush and small trees should be removed from the downstream slope and toe area to enable close inspection of the slope and toe area for possible seepage.

An emergency action plan should be available for every dam in the high and significant category. Such plans should outline actions to be taken by the operator to minimize downstream effects of an emergency and should include an effective warning system. No emergency action plan has been developed, and the owner should develop such a plan.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features.

a. Design Data. Limited information relative to the hydraulic design of the spillway were available for review. Available information contained in the DER files indicates that a design discharge capacity of 1500 cfs was considered for the structure. The design capacity was associated with a spillway crest length of 35 feet and an available head of 5 feet. It is apparent that the design capacity is less than that recommended by current guidelines.

b. Experience Data. No rainfall, runoff or reservoir level data were available. The spillway reportedly has functioned adequately in the past.

c. Visual Observations. The spillway appeared to be in fair condition and adequately maintained. No erosion of the spillway approach was observed during the inspection, but the potential exists for erosion of the earthen embankment at the right of the spillway approach.

The low spot on the embankment crest was observed to exist at the right abutment of the structure.

d. Overtopping Potential. Overtopping potential was investigated through the development of the probable maximum flood (PMF) for the watershed and the subsequent routing of the PMF and fractions of the PMF through the reservoir and spillway.

The Corps of Engineers, Baltimore District, has directed that the HEC-1 Dam Safety Version systemized computer program be utilized. The program was prepared by the Hydrologic Engineering Center (HEC), U.S. Army Corps of Engineers, Davis, California, July, 1978. The major methodologies or key input data for this program are discussed briefly in Appendix D.

5.2 Evaluation Assumptions. To complete the hydraulic and hydrologic analysis for this structure, it was necessary to make the following assumptions.

1. Pool elevation in the reservoir prior to the storm was assumed to be at the spillway crest elevation, 1672.0.

2. The top of dam was considered to be the low spot elevation at the right abutment, 1676.7.

3. The control section at the spillway was considered as exhibiting the characteristics of a semi-sharp crested weir. The crest elevation was considered to be a constant elevation along its entire length. The spillway was considered to be rectangular section for the purposes of this analysis.

5.3 Summary of Overtopping Analysis. Complete summary sheets for the computer output are presented in Appendix D.

Peak inflow (PMF)	5800 cfs
Spillway capacity	1060 cfs

a. Spillway Adequacy Rating. The Spillway Design Flood (SDF) is based on the hazard and size classification of the dam. The recommended spillway design flood for a dam of this size and classification is in the range of 1/2 PMF to PMF. Based on the potential for loss of life and property damage, the spillway design flood has been selected as the PMF. Based on the following definition provided by the Corps of Engineers, the spillway is rated as inadequate as a result of our hydrologic analysis.

> Inadequate - All high hazard dams which do not pass the spillway design flood (PMF).

The spillway and reservoir are capable of controlling approximately 25% of the PMF without overtopping the embankment.

5.4 Summary of Dam Breach Analysis. The analysis indicates the subject dam cannot satisfactorily pass 50% of the PMF, it was necessary to perform the dam breach analysis and downstream routing of the flood wave. This analysis determined the degree of increased flooding and due to dam failure. A pool elevation of 1678.0 was considered as sufficient to cause failure of the dam due to overtopping.

Results of the dam breach analysis indicate that the downstream potential for loss of life and property damage is not significantly increased by dam failure from that which existed just prior to the failure. Therefore, the spillway is rated as inadequate, but not seriously inadequate. Details of the downstream routing of the flood wave are included in Appendix D.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. No visible deficiencies were observed on the embankment which would affect the stability of the structure. No erosion was observed on the embankment crest or slopes. No seepage was observed during the inspection. The downstream slope and toe area of the structure were covered with small trees and brush which hampered attempts at close visual inspection of the slope and toe area. The small trees and brush should be removed from the slope and toe area, and the area reinspected to verify that no seepage exists at the structure.

The spillway appeared to be in fair condition and adequately maintained. No visible deficiencies were observed at the structure which would affect the discharge capability of the structure. It was observed during the inspection that no protection exists along the embankment at the approach to the spillway. During periods of large discharges at the spillway the potential exists for erosion of the right edge of the spillway approach. This erosion could cause damage to the embankment in the area of the spillway.

b. Design and Construction Data. No information was available in the DER files relative to the construction of the dam. The existing dam appears to have been the result of design modifications to an original structure which existed in 1948. The design modifications culminated in the subsequent completion of the original structure. The modifications to the design of the present structure were completed by Mr. Jesse S. Richey, an engineer from Wellsboro, Pennsylvania. The construction of the dam was apparently completed under the direction of the owner, and the construction was completed sometime in late 1951.

c. Operating Records. No operating records exist for the dam.

d. Post Construction Changes. No post construction changes are known to have occurred since construction of the dam was completed in 1951.

e. Seismic Stability. The dam is located in seismic zone 1. No seismic stability analyses has been performed. Normally, it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake loading. Since no signs of instability were noted during the inspection, the Roscoe Burgess Dam is assumed to be safe for earthquake loading.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The dam appears to be in fair condition and fairly well maintained. No erosion was observed on the embankment crest or slopes. No seepage was observed on the downstream slope of the dam or along the toe area.

The potential for erosion exists on the embankment in the area of the spillway approach. No spillway approach wingwall exists at the structure at this location. No erosion in the area was observed during the inspection but during periods of increased inflow to the reservoir the potential for large discharges at the spillway include the potential for erosion of the embankment at the approach to the spillway. No drainline exists for the reservoir which is considered a defficiency.

The visual observations, review of available data, hydrologic and hydraulic calculations and past operational performance indicate that the Roscoe Burgess Dam is capable of controlling approximately 25% of the PMF. If the low spot on the embankment crest adjacent to the right abutment were filled to an elevation consistent with the remaining portion of the crest, no significant increase in the storage and discharge potential of the spillway and reservoir would be realized. The spillway is termed inadequate.

b. Adequacy of Information. Sufficient information is available to complete a Phase I report.

c. Urgency. The recommendations suggested below should be implemented as soon as possible

d. Necessity for Further Investigation. In order to accomplish some of the recommendations/remedial measures outlined below, further investigations will be required by a professional engineer knowledgeable in dam design and construction.

7.2 Recommendations/Remedial Measures.

1. A detailed hydrologic and hydraulic analysis should be conducted by a registered professional engineer knowledgeable in dam design and construction to increase the spillway capacity.

2. The brush and small trees on the downstream slope of embankment and in the area of the toe should be removed under the direction of a registered professional engineer knowledgeable in dam design and construction to insure that the removal of the vegetation does not seriously affect the stability of the structure.

3. No reservoir drain exists for the structure. This is considered a deficiency and some means, with an upstream control, should be provided to drain the reservoir should the need arise to do so.

4. A warning system should be developed to warn downstream residents of imminent failure of the dam.

5. A regularly scheduled maintenance program should be planned and implemented at the dam.

6. A safety inspection program should be implemented with inspections at regular intervals by qualified personnel.

APPENDIX A
CHECKLIST, VISUAL INSPECTION, PHASE I

CHECK LIST
VISUAL INSPECTION
PHASE I

NAME OF DAM Roscoe Burgess Dam COUNTY Sullivan STATE Pennsylvania ID# 357

TYPE OF DAM Earthfill HAZARD CATEGORY High

DATE(s) INSPECTION October 22, 1980 WEATHER Clear and cold. TEMPERATURE 20°

POOL ELEVATION AT TIME OF INSPECTION 1671.5 M.S.L. TAILWATER AT TIME OF INSPECTION None M.S.L.

INSPECTION PERSONNEL:

R. Jeffrey Kimball, P.E. - L. Robert Kimball and Associates

James T. Hockensmith - L. Robert Kimball and Associates

O.T. McConnell - L. Robert Kimball and Associates

O.T. McConnell
RECORDER

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None noted.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None noted.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None noted.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Appears to be all right.	
RIPRAP FAILURES	None.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	Brush and small trees exist on the downstream slope of the dam and along the area of the toe.	The brush and trees should be be removed from the embankment slope and toe area.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	The low spot on the embankment crest was observed to exist at the right abutment of the the dam. It was observed that the potential for erosion of the embankment exists at the spillway approach.	
ANY NOTICEABLE SEEPAGE	No seepage observed. The downstream slope and toe area of the structure were covered with vegetation which hampered attempts at close visual inspection of the slope and toe.	Brush and small trees should be removed and the slope and toe area reinspected to verify that no seepage exists.
STAFF GAUGE AND RECORDER	None.	
DRAINS	None.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Not applicable.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Not applicable.	
DRAINS	Not applicable.	
WATER PASSAGES	Not applicable.	
FOUNDATION	Not applicable.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Not applicable.	
STRUCTURAL CRACKING	Not applicable.	
VERTICAL AND HORIZONTAL ALIGNMENT	Not applicable.	
MONOLITH JOINTS	Not applicable.	
CONSTRUCTION JOINTS	Not applicable.	
STAFF GAUGE OR RECORDER	Not applicable.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not applicable.	
INTAKE STRUCTURE	Not applicable.	
OUTLET STRUCTURE	Not applicable.	
OUTLET CHANNEL	Not applicable.	
EMERGENCY GATE	Not applicable.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	The spillway appeared to be in fair condition and fairly well maintained. No deficiencies were observed in the area of the spillway which would affect the discharge potential of the spillway.	
APPROACH CHANNEL	The potential for erosion of the embankment in the area of the approach exists.	
DISCHARGE CHANNEL	The discharge channel is clear of any debris and appears capable of discharging flows from the spillway.	
BRIDGE AND PIERS	A wooden bridge exists across the area of the spillway. Wooden piers support the bridge near mid-span.	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not applicable.	
APPROACH CHANNEL	Not applicable.	
DISCHARGE CHANNEL	Not applicable.	
BRIDGE AND PIERS	Not applicable.	
GATES AND OPERATION EQUIPMENT	Not applicable.	

DOWNSTREAM CHANNEL

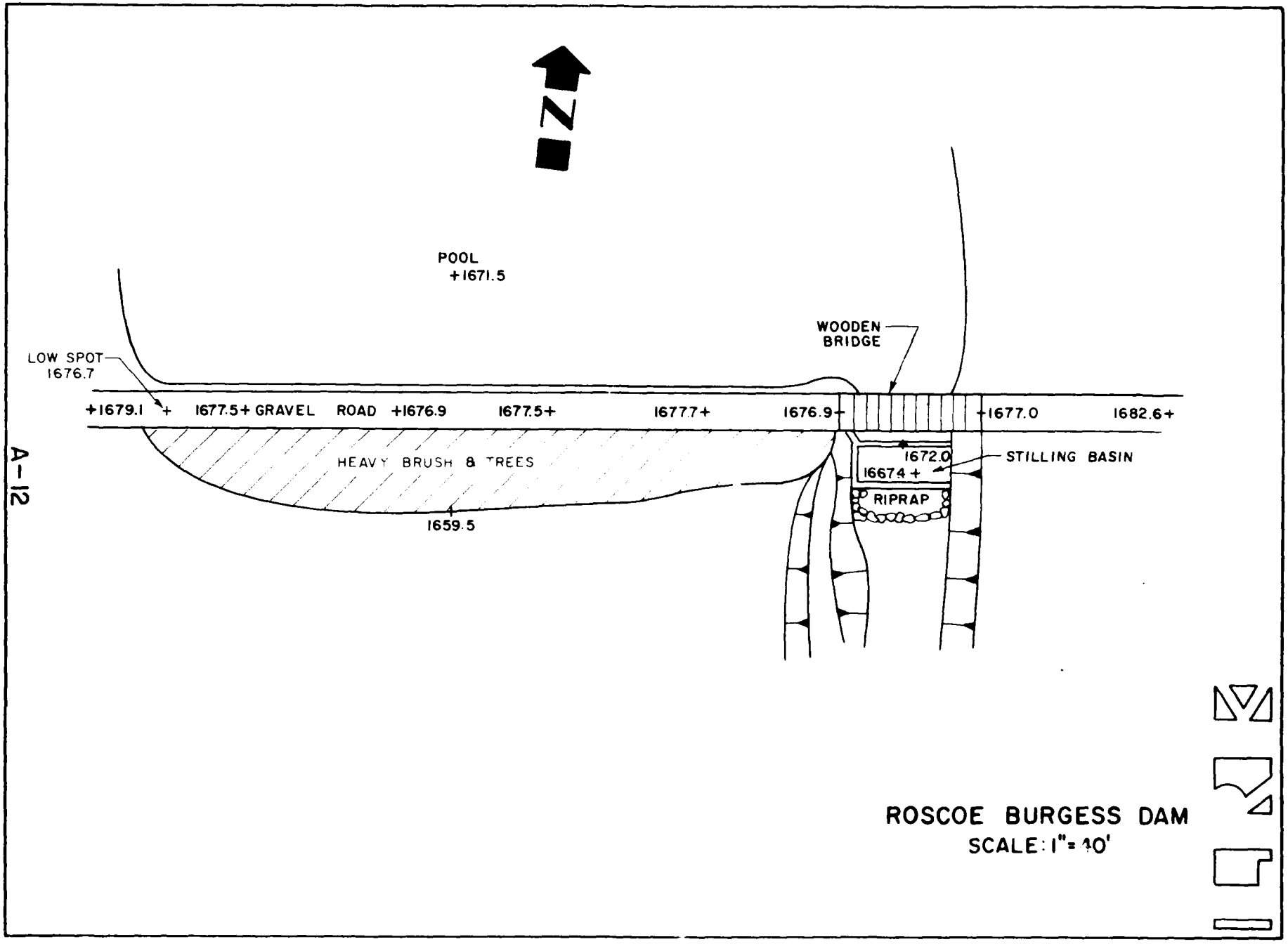
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The spillway discharge channel for the Roscoe Burgess Dam consists of Kings Creek. No obstructions or debris were observed in the channel.	
SLOPES	Appear to be stable.	
APPROXIMATE NO. OF HOMES AND POPULATION	The Village of Estella is located approximately 4 miles downstream of the dam. The population of the village is estimated at approximately 50 people.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Moderate.	
SEDIMENTATION	Unknown.	

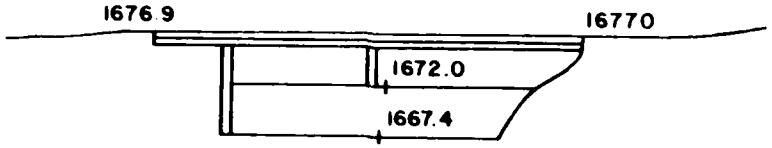
INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	
PIEZOMETERS	None.	
OTHER	None.	



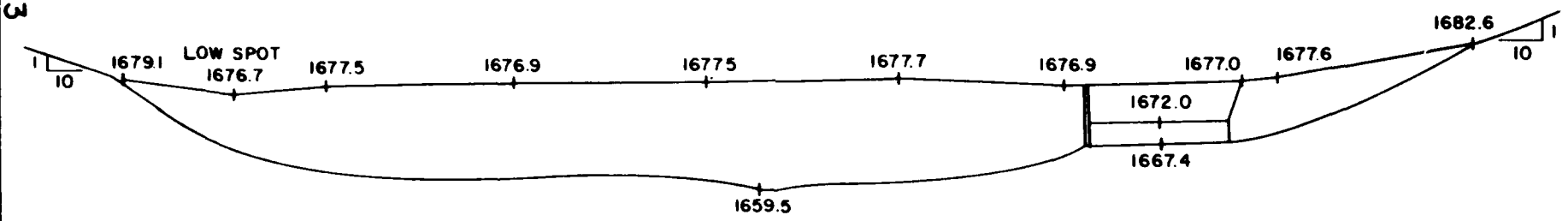
A-12

ROSCOE BURGESS DAM
SCALE: 1" = 10'



SPILLWAY PROFILE
LOOKING UPSTREAM
NO SCALE

A-13



PROFILE
LOOKING UPSTREAM

SCALE : HORIZ. 1" = 40'
VERT. 1" = 20'

ROSCOE BURGESS DAM

APPENDIX B
CHECKLIST, ENGINEERING DATA, DESIGN, CONSTRUCTION, OPERATION, PHASE I

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Roscoe Burgess Dam

ID# 357

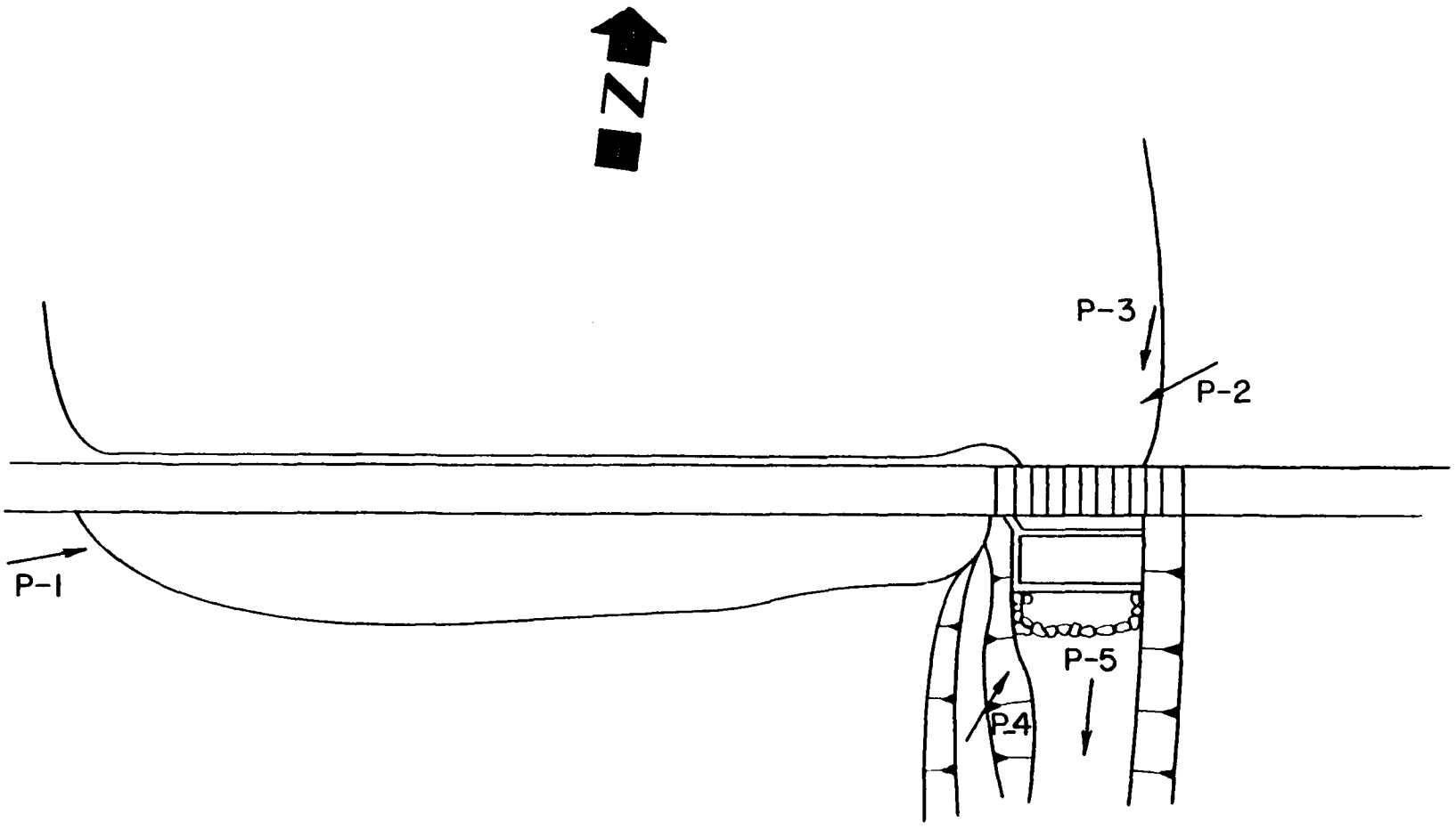
ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	U.S.G.S. quadrangle.
CONSTRUCTION HISTORY	Limited information available in DER files.
TYPICAL SECTIONS OF DAM	See Appendix E.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS RAINFALL/RESERVOIR RECORDS	See Appendix E. See Appendix E. See Appendix E. None. None.

ITEM	REMARKS
DESIGN REPORTS	Unknown.
GEOLOGY REPORTS	Unknown.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None.
POST-CONSTRUCTION SURVEYS OF DAM	None known to have occurred.
BORROW SOURCES	Unknown.

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None known to exist since construction of the structure.
HIGH POOL RECORDS	None.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None known to exist.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None known to have occurred since construction of the dam was completed in 1951.
MAINTENANCE OPERATION RECORDS	None.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See Appendix E.
OPERATING EQUIPMENT PLANS & DETAILS	None.

APPENDIX C
PHOTOGRAPHS



ROSCOE BURGESS DAM
PHOTO INDEX

P- INDICATES PHOTO LOCATION

ROSCOE BURGESS DAM
PA 357

Sheet 1

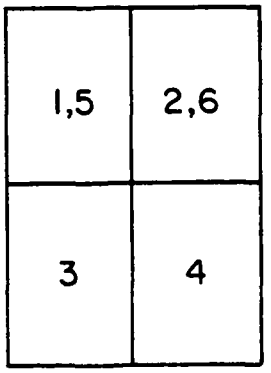
Front

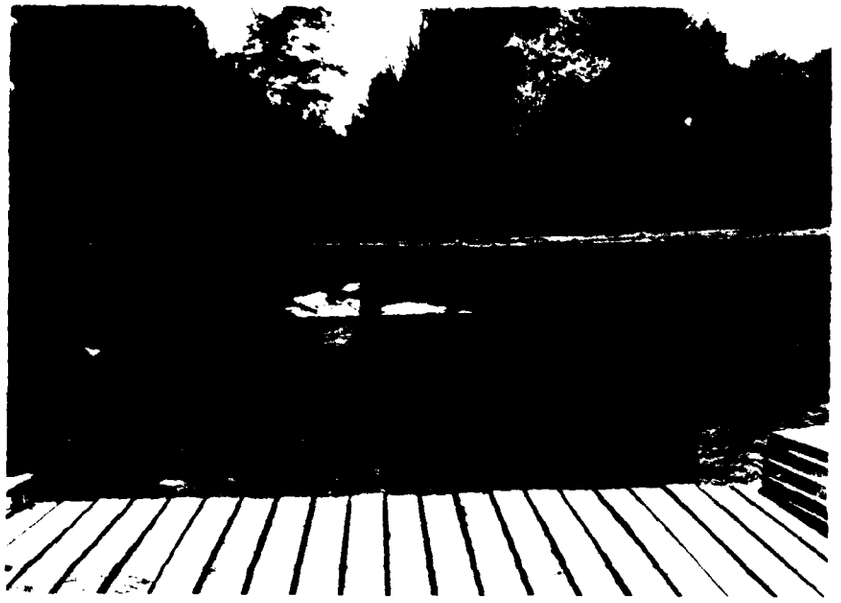
(1) Upper left - View of the embankment crest and downstream slope. View towards the left abutment.
(2) Upper right - View of the crest and upstream slope. View towards the right abutment.
(3) Lower left - Spillway approach. Note the wooden bridge which spans the spillway crest.
(4) Lower right - View of the spillway crest.

Back

(5) Upper left - Discharge channel.
(6) Upper right - Downstream exposure.

TOP OF PAGE





APPENDIX D
HYDROLOGY AND HYDRAULICS

APPENDIX D
HYDROLOGY AND HYDRAULICS

Methodology. The dam overtopping and breach analyses were accomplished using the systemized computer program HEC-1 (Dam Safety Investigation), September, 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. A brief description of the methodology used in the analysis is presented below.

1. Precipitation. The Probable Maximum Precipitation (PMP) is derived and determined from regional charts prepared from past rainfall records including "Hydrometeorological Report No. 33" prepared by the U.S. Weather Bureau.

The index rainfall may be reduced from 10% to 20% depending on watershed size by utilization of what is termed the HOP Brook adjustment factor. Distribution of the total rainfall is made by the computer program using distribution methods developed by the Corps.

2. Inflow Hydrograph. The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for reservoir routing.

The unit hydrograph is developed using the Snyder method. This method requires calculation of several key parameters. The following list gives these parameters their definition and how they were obtained for these analysis.

Parameter	Definition	Where Obtained
Ct	Coefficient representing variations of watershed	From Corps of Engineers*
L	Length of main stream channel miles	From U.S.G.S. 7.5 minute topgraphic
Lca	Length on main stream to centroid of watershed	From U.S.G.S. 7.5 minute topographic
Cp	Peaking coefficient	From Corps of Engineers*
A	Watershed size	From U.S.G.S. 7.5 minute topographic

*Developed by the Corps of Engineers on a regional basis for Pennsylvania.

3. Routing. Reservoir routing is accomplished by using Modified Plus routing techniques where the flood hydrograph is routed through reservoir storage. Hydraulic capacities of the outlet works, spillways and the crest of the dam are used as outlet controls in the routing.

The hydraulic capacity of the outlet works can either be calculated and input or sufficient dimensions input, and the program will calculate an elevation discharge relationship.

Storage in the pool area is defined by an area - elevation relationship from which the computer calculates storage. Surface areas are either planimetered from available mapping or U.S.G.S. 7.5 minute series topographic maps or taken from reasonably accurate design data.

4. Dam Overtopping. Using given percentages of the PMF, the computer program will calculate the percentage of the PMF, which can be controlled by the reservoir and spillway without the dam overtopping.

5. Dam Breach and Downstream Routing. The computer program is equipped to determine the increase in downstream flooding due to failure of the dam caused by overtopping. This is accomplished by routing both the pre-failure peak flow and the peak flow through the breach (calculated by the computer with given input assumptions) at a given point in time and determining the water depth in the downstream channel. Channel cross-sections taken from U.S.G.S. 7.5 minute topographic maps were used in the downstream flood wave routing. Pre and post failure water depths are calculated at locations where cross-sections are input.

HYDROLOGY AND HYDRAULICS ANALYSIS
DATA BASE

NAME OF DAM: Roscoe Burgess Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 (0.98) = 21.76 inches

STATION	1	2	3
Station Description			
Drainage Area (square miles)	1.61		
Cumulative Drainage Area (square miles)	1.61		
Adjustment of PMF for Drainage Area (%)(1)			
6 hours	117		
12 hours	127		
24 hours	136		
48 hours	143		
72 hours	145		
Snyder Hydrograph Parameters			
Zone (2)	17		
Cp (3)	0.45		
Ct (3)	1.13		
L (miles) (4)	1.45		
Lca (miles) (4)	0.57		
tp = Ct(LxLca) $^{0.3}$ hrs.	1.08		
Spillway Data			
Crest Length (ft)	31.5		
Freeboard (ft)	4.7		
Discharge Coefficient	3.3		
Exponent	1.5		

(1) Hydrometeorological Report 40 (Figure 1), U.S. Weather Bureau and U.S. Army Corps of Engineers, 1965.
(2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's coefficients (C_p and C_t).
(3) Snyder's Coefficients.
(4) L=Length of longest water course from outlet to basin divide. L_{ca}=Length of water course from outlet to point opposite the centroid of drainage area.

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 1.61 sq.mi.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1672.0 [105 ac-ft]

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1676.7 [318 ac-ft]

ELEVATION MAXIMUM DESIGN POOL: 1676.0

ELEVATION TOP DAM: 1676.7

SPILLWAY CREST:

a. Elevation 1672.0
b. Type Semi-sharp crest
c. Width Crest length=31.5 feet
d. Length Approximately 25 feet
e. Location Spillover Left abutment
f. Number and Type of Gates None

OUTLET WORKS:

a. Type None
b. Location None
c. Entrance inverts None
d. Exit inverts None
e. Emergency drawdown facilities None

HYDROMETEOROLOGICAL GAUGES:

a. Type None
b. Location None
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: Unknown

LOSS RATE AND BASE FLOW PARAMETERS

AS RECOMMENDED BY THE [illegible] DISTRICT CORPS OF ENGINEERS.

STRTL = 1 INCH
CNSTL = 0.05 IN/HR
STRTQ = 1.5 CFS/MI²
QRCSN = 0.05 (5% OF PEAK FLOW)
RTIOR = 2

ELEVATION-AREA-CAPACITY RELATIONSHIPS

FROM USGS 7.5 MIN. QUAD, SEE [illegible] AND FIELD INSPECTION DATA.

SPILLWAY CREST ELEVATION = [illegible]
AREA OF POOL AT ELEV. [illegible] = 23.5 ACRES
ELEVATION WHERE AREA EQUALS ZERO = [illegible]

FROM THE CONIC METHOD FOR RESERVOIR VOLUME, FLOOD HYDROGRAPH PACKAGE (HEC-1), DAM SAFETY VERSION (USERS MANUAL).

$H = 3V/A$
$H = 3V/23.5$
$\therefore V = H(23.5)/3$
$V = 104.5$ AC-FT

AT ELEV. 1680, AREA = 74 ACRES
AT ELEV. 1700, AREA = [illegible] ACRES

TOP OF DAM LOW SPOT ELEVATION = [illegible]

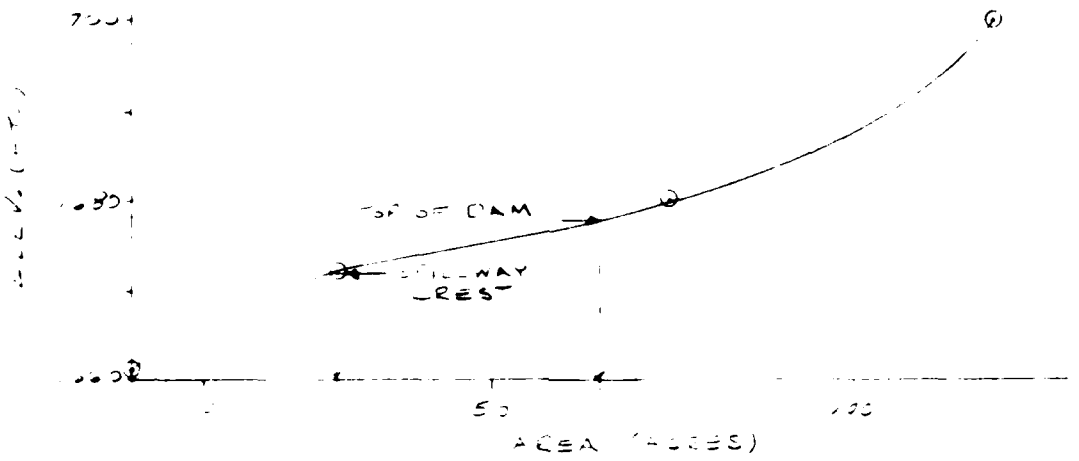
NAME _____

NUMBER PA-357

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG PENNSYLVANIA

SHEET NO. 2 OF 4

BY DTM DATE 3/81

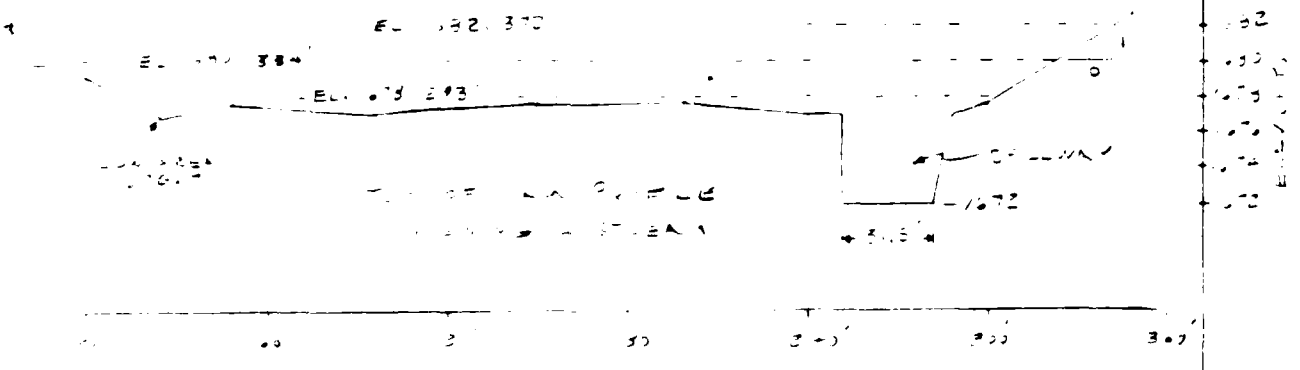


AREA	CFS	DE	TA	P
EL	0.0	0.2	0.7	0.80	1.00

STAGE CAPACITY

Q = [illegible] USE C = 3.3 (SEMI-BROAD CREST)
L = 31.5' H = VALUES

[illegible] USE C = 3.0 (BROAD CREST)
L = VALUES WITH H/



RATING CURVE INCLUDES OVERTOPPING.

ELEV. (FT.)	SPILLWAY			OVERTOPPING			DISCHARGE *Q (CFS)
	h (FT.)	L (FT.)	Q (CFS)	h (FT.)	L (FT.)	Q (CFS)	
1672	0	31.5'	0				0
1672.5	0.5	"	35				35
1673	1	"	105				105
1673.5	.5	"	190				190
1674	2	"	295				295
1675	3	"	540				540
1676.7	4.7	"	1060				1,060
1678				1.3	293'	1,300	2,360
1680				3.3	334'	6,005	7,065
1682				5.3	372'	13,615	14,675

*Q ROUNDED TO NEAREST 5 CFS.

BREACH ANALYSIS

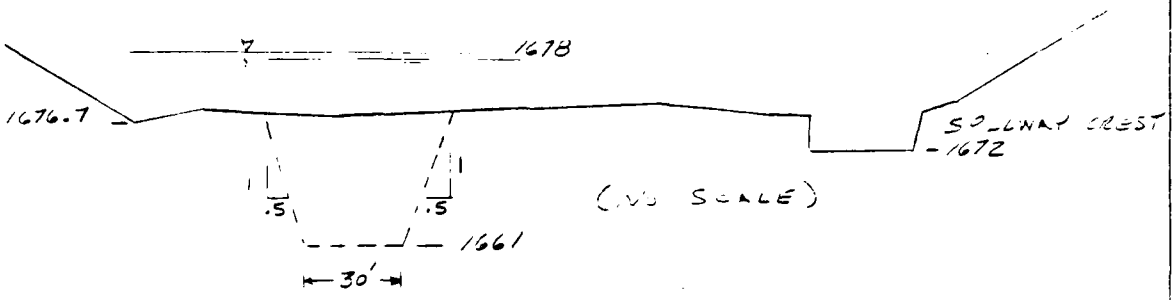
THE HEC-1 PMF ANALYSIS INDICATES THAT THE ROSCOE BURGESS DAM IS OVERTOPPED BY 1.33 FEET DURING THE ½ PMF. THE OVERTOPPING IS CONSIDERED TO BE OF A MAGNITUDE AND DURATION SUFFICIENT TO CAUSE FAILURE OF THE DAM.

THE MAXIMUM OVERTOPPING (1.33') OCCURS AT THE RIGHT ABUTMENT. THE RIGHT ABUTMENT AREA APPEARED TO BE CAPABLE OF SUSTAINING LIMITED OVERTOPPING. THEREFORE, FOR THE PURPOSE OF ANALYSIS THE BEACH IS ASSUMED TO OCCUR NEAR M.O. EMBANKMENT.

L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS
EBENSBURG PENNSYLVANIA

NAME
NUMBER PA - 357
SHEET NO. 4 OF 4
BY DTM DATE 3/81

FROM FIG ON PAGE 2 OF 4



(NO SCALE)

BRWID = 30'
Z = 0.5
ELBM = 1661
TFAIL = 2 HRS.
WSEL = 1672
FAILEL = 1678

0.5 PMF UTILIZED FOR BREACH ANALYSIS.

REACH CROSS-SECTIONS FROM U.S.G.S. QUAD. SEE PAGE D-15 AND E-1.

OVERBANK MANNINGS' n = 0.06 (ASSUMED)
CHANNEL MANNINGS' n = 0.05 (ASSUMED.

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********
```

```
    1              A1      ANALYSIS OF DAM OVERTOPPING USING RATIOS OF THE PMF
    2              A2      HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF BURGESS DAM
    3              A3      RATIOS OF PMF ROUTED THROUGH THE RESERVOIR (PA-357)
    4              B   288        0       15        0        0        0        0        0        0        0
    5              B1    5
    6              J     1        3        1
    7              J1   .1       .5        1
    8              K     0        1                                    1
    9              K1      INFLOW
   10              M     1        1     1.61                    1                                 1
   11              P           21.76      117      127      136      143      145
   12              T                                                    1.0     0.05
   13              W  1.08     0.49
   14              X  -1.5     -.05      2.0
   15              K     1        2                                    1
   16              K1      ROUTE THROUGH BURGESS
   17              Y                                      1        1
   18              Y1    1                                           -1672      -1
   19              Y4 1672  1672.5     1673   1673.5     1674     1675   1676.7     1678     1680     1682
   20              Y5    0       35      105      190      295      540     1060     2360     7065    14675
   21              $A    0     28.5       65       74      119
   22              $E 1661     1672   1676.7     1680     1700
   23              $S 1672
   24              $D1676.7
   25              K    99
```

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
****

RUN DATE= 81/03/05.
TIME= 17.30.38.

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF THE PMF
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF BURGESS DAM
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR (PA-357)

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
288		15	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 3 LRTIO= 1
RTIOS= .10 .50 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.61	0.00	1.61	1.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.76	117.00	127.00	136.00	143.00	145.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.08 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 4.61 AND R= 6.92 INTERVALS

UNIT HYDROGRAPH 40 END-OF-PERIOD ORDINATES, LAG= 1.08 HOURS, CP= .45 VOL= 1.00

40.	148.	286.	395.	424.	386.	334.	289.	250.	216.
187.	162.	140.	121.	105.	91.	78.	68.	59.	51.
44.	38.	33.	28.	25.	21.	18.	16.	14.	12.

HYDROGRAPH ROUTING

ROUTE THROUGH BURGESS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1672.	-1

STAGE	1672.00	1672.50	1673.00	1673.50	1674.00	1675.00	1676.70	1678.00	1680.00
/1682.00									
FLOW	0.00	35.00	105.00	190.00	295.00	540.00	1060.00	2360.00	7065.00
/14675.00									
SURFACE AREA=	0.	29.	65.	74.	119.				
CAPACITY=	0.	105.	318.	548.	2460.				
ELEVATION=	1661.	1672.	1677.	1680.	1700.				

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1672.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1676.7	0.0	0.0	0.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .10	RATIO 2 .50	RATIO 3 1.00
HYDROGRAPH AT	1	1.61	1	579.	2896.	5793.
	(	4.17)	(	16.40)(	82.02)(	164.04)(
ROUTED TO	2	1.61	1	383.	2437.	5458.
	(	4.17)	(	10.84)(	69.02)(	154.54)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1672.00	1672.00	1676.70
STORAGE	105.	105.	318.
OUTFLOW	0.	0.	1060.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1674.36	0.00	190.	383.	0.00	42.75	0.00
.50	1678.03	1.33	407.	2437.	4.25	41.75	0.00
1.00	1679.32	2.62	498.	5458.	7.25	41.25	0.00

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1                A1       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
    2                A2       DOWNSTREAM CONDITIONS DUE TO OVERTOPPING OF BURGESS DAM
    3                A3       PLAN 1 ASSUMES BREACH, PLAN 2 ASSUMES NO BREACH (PA-357)
    4                B    288        0       15        0        0        0        0        0        0        0
    5                B1     5
    6                J      2        1        1
    7                J1    .5
    8                K      0        1                                          1
    9                K1       INFLOW
   10                M      1        1     1.61                                1                          1
   11                P           21.76      117      127      136      143      145
   12                T                                                         1.0     0.05
   13                W   1.08     0.45
   14                X   -1.5     -.05      2.0
   15                K      1        2                                          1
   16                K1       ROUTE THROUGH BURGESS
   17                Y                                          1        1
   18                Y1     I                                                 -1672      -1
   19                Y4  1672  1672.5     1673   1673.5     1674     1675   1676.7     1678     1680     1682
   20                Y5     0       35      105      190      295      540     1060     2360     7065    14675
   21                $A     0     28.5       65       74      119
   22                $E  1661     1672   1676.7     1680     1700
   23                $S  1672
   24                $D1676.7
   25                $B    30      0.5     1661        2     1672     1678
   26                $B    30      0.5     1661        2     1672     1680
   27                K      1        3                                          1
   28                K1       REACH NO. 1
   29                Y                                          1        1
   30                Y1     1
   31                Y6   .06      .05      .06     1508     1540    11000    0.014
   32                Y7     0     1540       80     1520      500     1510      502     1508      508     1508
   33                Y7   510     1510      700     1520      820     1540
   34                K      1        4                                          1
   35                K1       REACH NO. 2
   36                Y                                          1        1
   37                Y1     1
   38                Y6   .06      .05      .06     1348     1380    10000    0.016
   39                Y7     0     1380       50     1360      125     1350      127     1348      133     1348
   40                Y7   135     1350      200     1360      400     1380
   41                K     99
```

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
****

RUN DATE= 81/03/09.
TIME= 12.18.03.

RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
DOWNSTREAM CONDITIONS DUE TO OVERTOPPING OF BURGESS DAM
PLAN 1 ASSUMES BREACH. PLAN 2 ASSUMES NO BREACH (PA-357)

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
288	0	15	0	0	0	0	0	0	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 2 NRTIO= 1 LRTIO= 1

RTIOS= .50

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.61	0.00	1.61	1.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.76	117.00	127.00	136.00	143.00	145.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.08 CP= .45 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 4.61 AND R= 6.92 INTERVALS

UNIT HYDROGRAPH 40 END-OF-PERIOD ORDINATES, LAG= 1.08 HOURS, CP= .45 VOL= 1.00

40.	148.	286.	395.	424.	386.	334.	289.	250.	216.
187.	162.	140.	121.	105.	91.	78.	68.	59.	51.
44.	38.	33.	28.	25.	21.	18.	16.	14.	12.

HYDROGRAPH ROUTING

REACH NO. 1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0600	.0500	.0600	1508.0	1540.0	11000.	.01400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1540.00 80.00 1520.00 500.00 1510.00 502.00 1508.00 508.00 1508.00
510.00 1510.00 700.00 1520.00 820.00 1540.00

STORAGE	0.00	3.27	21.92	83.52	188.82	337.81	530.49	766.88	1032.97
//1309.50									
	1587.21	1875.07	2170.10	2472.29	2781.64	3098.16	3421.84	3752.68	4090.69
//4435.86									
OUTFLOW	0.00	51.60	325.43	1519.40	4262.16	9061.16	16365.00	26584.31	42134.23
.61038.56									
	82841.10	107439.61	134761.78	164755.64	197383.83	232619.88	270445.62	310849.41	353824.85
399369.74									
STAGE	1508.00	1509.68	1511.37	1513.05	1514.74	1516.42	1518.11	1519.79	1521.47
//1523.16									
	1524.84	1526.53	1528.21	1529.89	1531.58	1533.26	1534.95	1536.63	1538.22
//1540.00									
FLOW	0.00	51.60	325.43	1519.40	4262.16	9061.16	16365.00	26584.31	42134.23
361038.56									
	82841.10	107439.61	134761.78	164755.64	197383.83	232619.88	270445.62	310849.41	353824.85
399369.74									

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

REACH NO. 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0600	.0500	.0600	1348.0	1380.0	10000.	.01600

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1380.00 50.00 1360.00 125.00 1350.00 127.00 1348.00 133.00 1348.00
135.00 1350.00 200.00 1360.00 400.00 1380.00

STORAGE	0.00	2.97	9.82	25.66	50.60	84.67	127.85	180.15	241.19
//1310.38									
	387.71	473.18	566.78	668.53	778.42	896.45	1022.61	1156.92	1299.37
//1449.95									
OUTFLOW	0.00	55.16	240.41	711.08	1609.19	3053.48	5149.89	7995.96	11758.03
316464.06									
	22157.63	28896.19	36738.90	45745.16	55973.99	67483.74	80331.95	94575.29	110269.58
127469.76									
STAGE	1348.00	1349.68	1351.37	1353.05	1354.74	1356.42	1358.11	1359.79	1361.47
//1363.16									
	1364.84	1366.53	1368.21	1369.89	1371.58	1373.26	1374.95	1376.63	1378.32
//1380.00									
FLOW	0.00	55.16	240.41	711.08	1609.19	3053.48	5149.89	7995.96	11758.03
116464.06									
	22157.63	28896.19	36738.90	45745.16	55973.99	67483.74	80331.95	94575.29	110269.58
127469.76									

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO APPLIED TO FLOWS 1 .50
HYDROGRAPH AT	1	1.61	1	2896.
		(4.17)		(82.02)
			2	2896.
				(82.02)
ROUTED TO	2	1.61	1	5061.
		(4.17)		(143.30)
			2	2437.
				(69.02)
ROUTED TO	3	1.61	1	4335.
		(4.17)		(122.75)
			2	2316.
				(65.57)
ROUTED TO	4	1.61	1	4172.
		(4.17)		(118.13)
			2	2287.
				(64.77)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1672.00	1672.00	1676.70
STORAGE	105.	105.	318.
OUTFLOW	0.	0.	1060.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1678.03	1.33	407.	5061.	2.63	43.50	41.50

PLAN 2 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1672.00	1672.00	1676.70
STORAGE	105.	105.	318.
OUTFLOW	0.	0.	1060.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1678.03	1.33	407.	2437.	4.25	41.75	0.00

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	4335.	1514.8	43.76

PLAN 2 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	2316.	1513.5	42.25

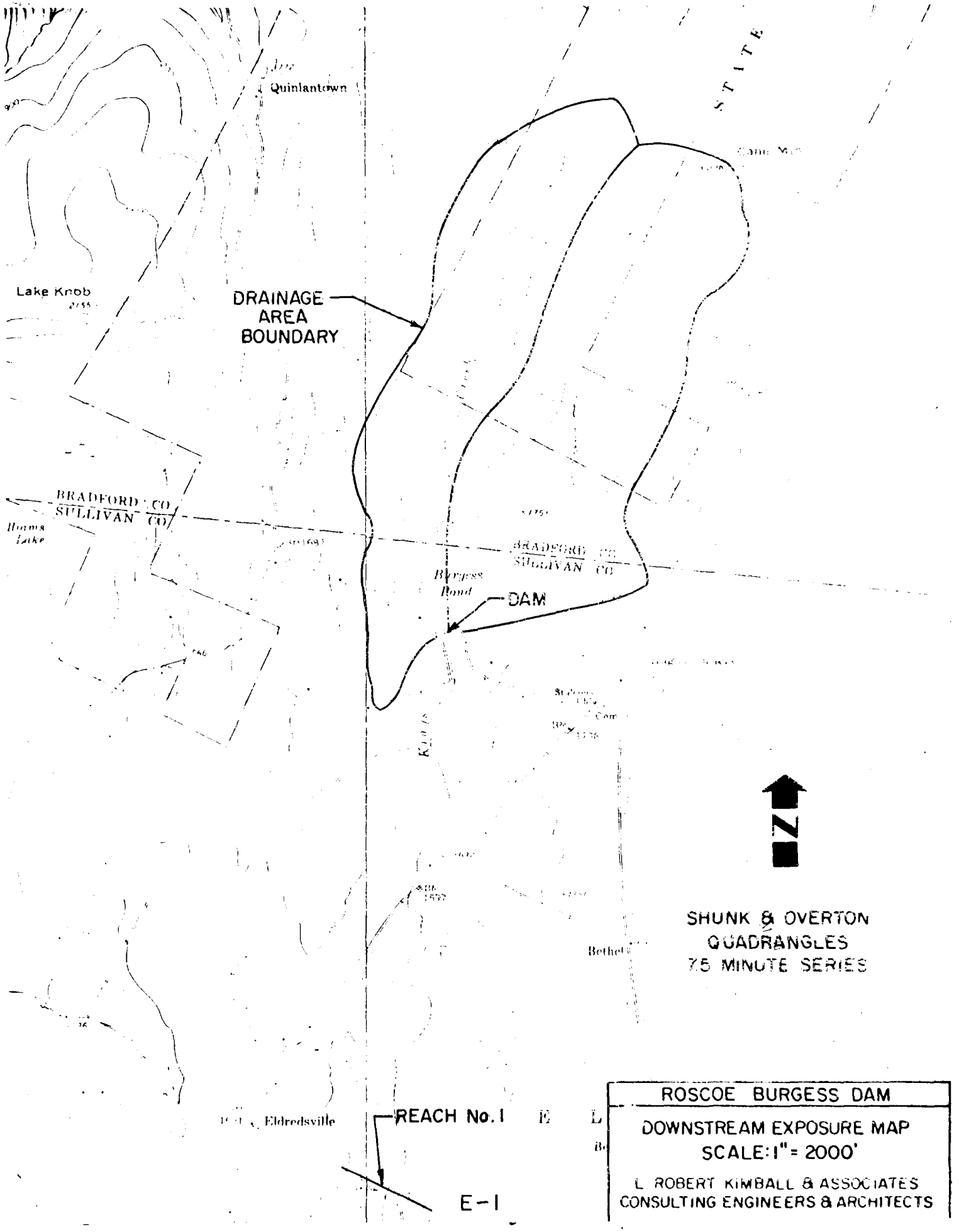
PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	4172.	1357.3	43.75

PLAN 2 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	2287.	1355.5	42.75

APPENDIX E
DRAWINGS

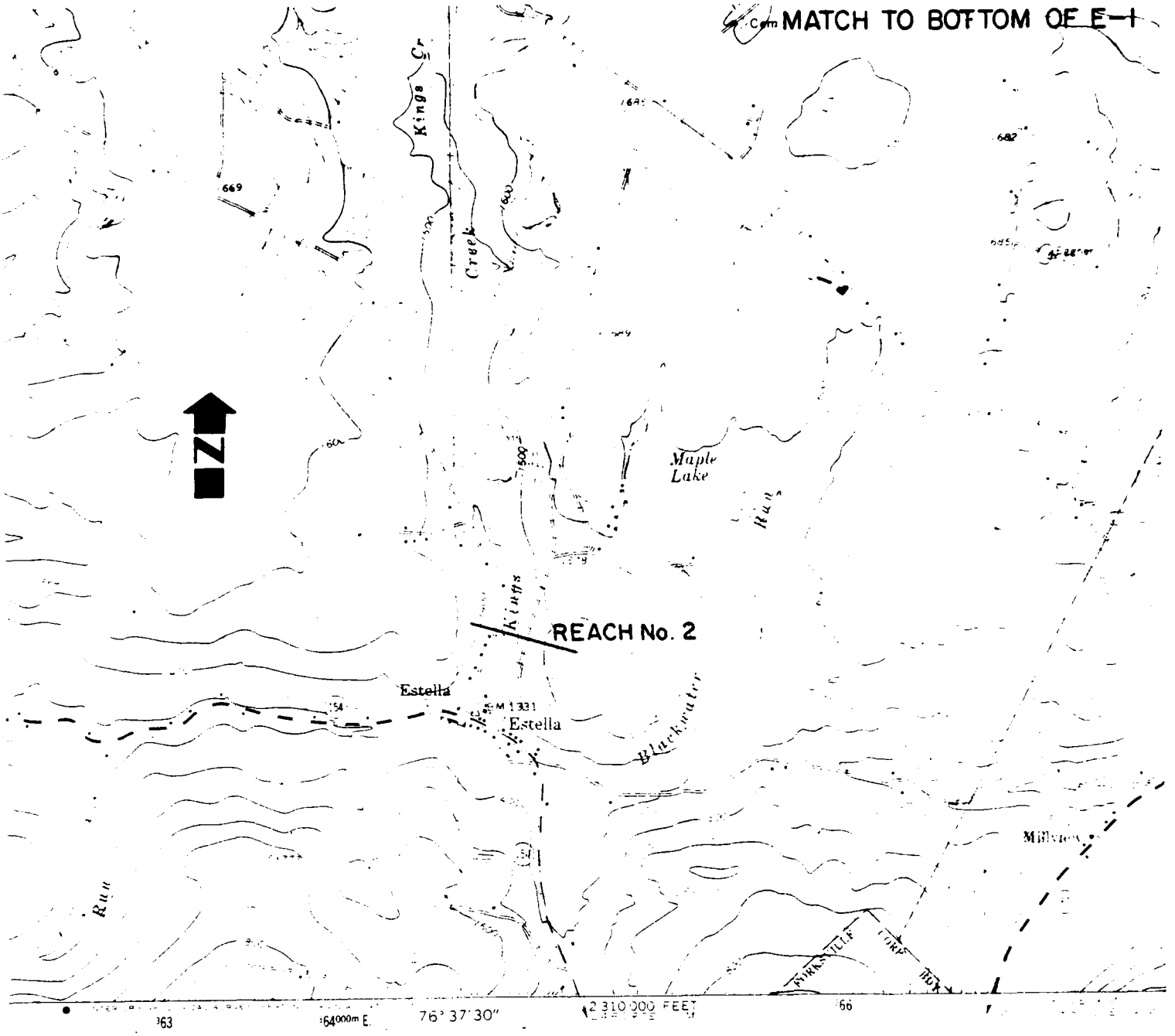


ROSCOE BURGESS DAM

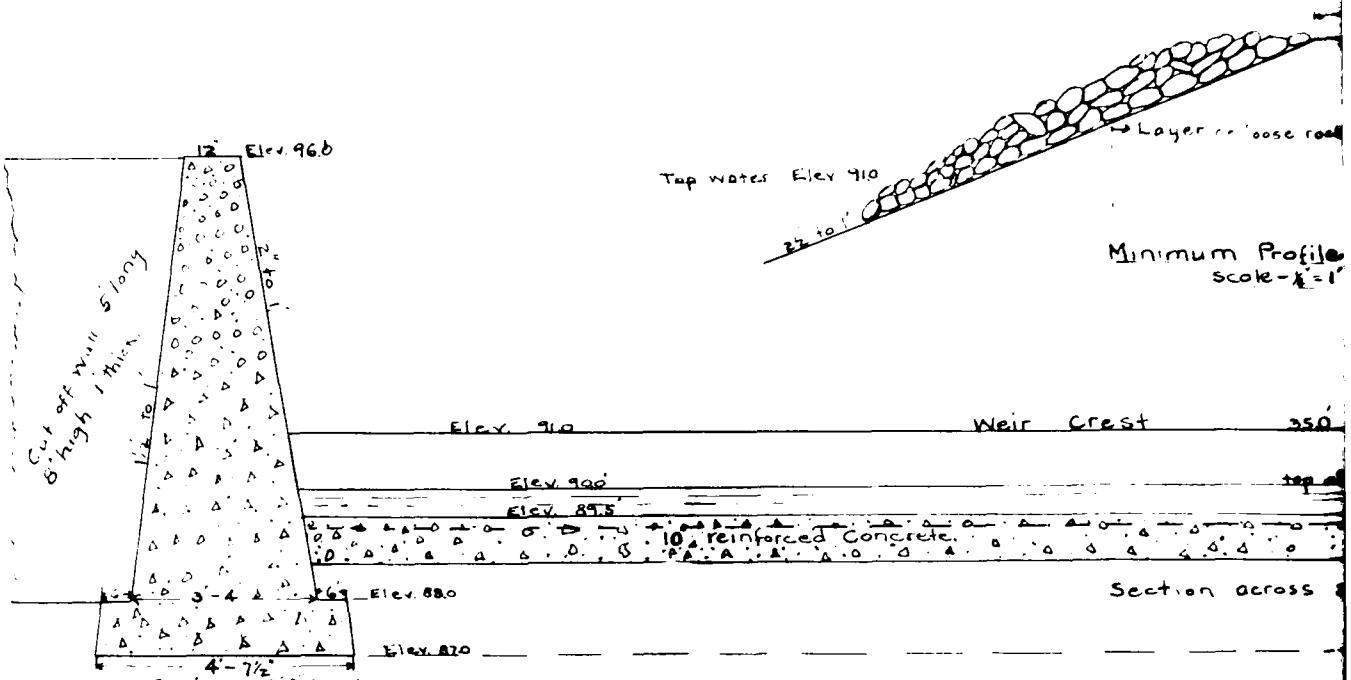
DOWNSTREAM EXPOSURE MAP

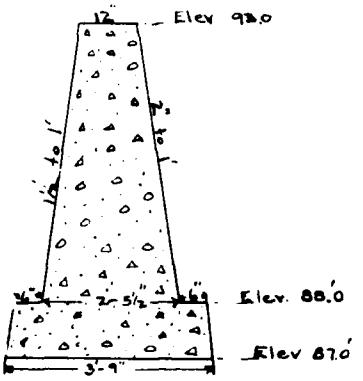
SCALE: 1" = 2000'

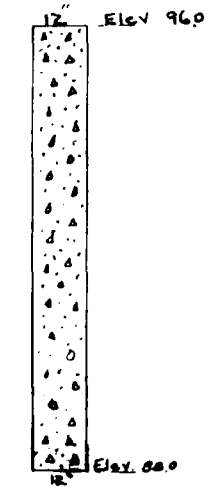
L. ROBERT KIMBALL & ASSOCIATES
CONSULTING ENGINEERS & ARCHITECTS

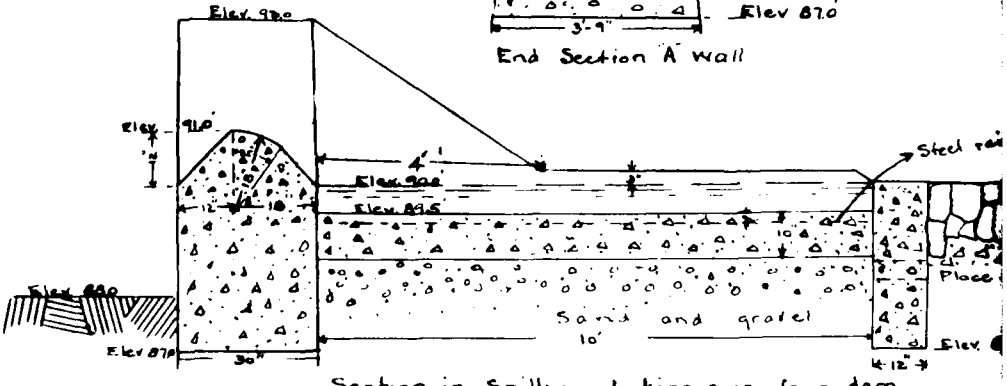


LOCATION PLAN
REACH No. 2

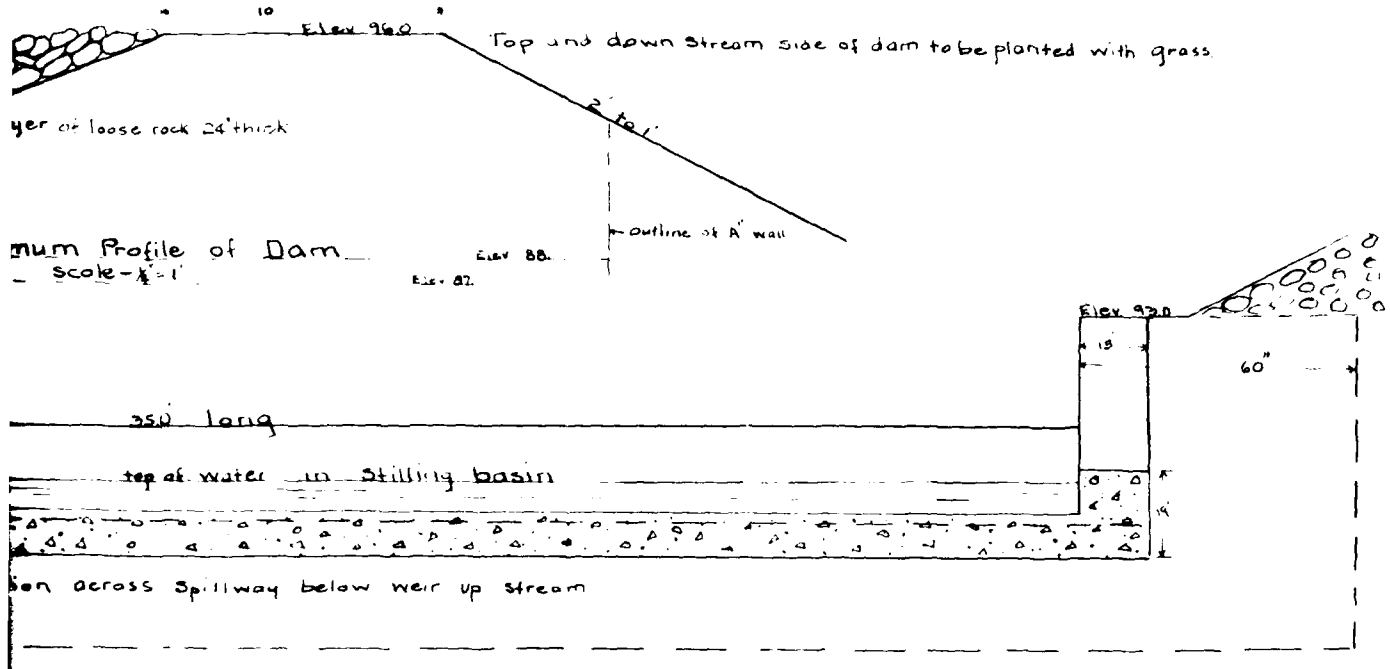








All Concrete to be 1 part cement, 2 parts sand, 4 parts gra

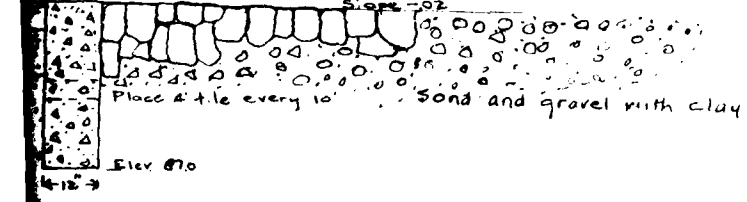


yer of loose rock 24" thick

num Profile of Dam
scale - 1/4" = 1'

ion across Spillway below weir up stream

Area wooded watershed 1.25 sq. mi. Probable Maximum runoff 1150 Sec. ft.
Flow in spillway "Kutters Formula" n = .02 S = .02 R = 2.0 water 24' deep = 1485. Sec. ft.
Flow over submerged weir "Fteley and Sterns Formula" H = 5.0' H' = 1.6' M = 3.20 = 1169 Sec. ft.
Area flooded = 20 ± Acres

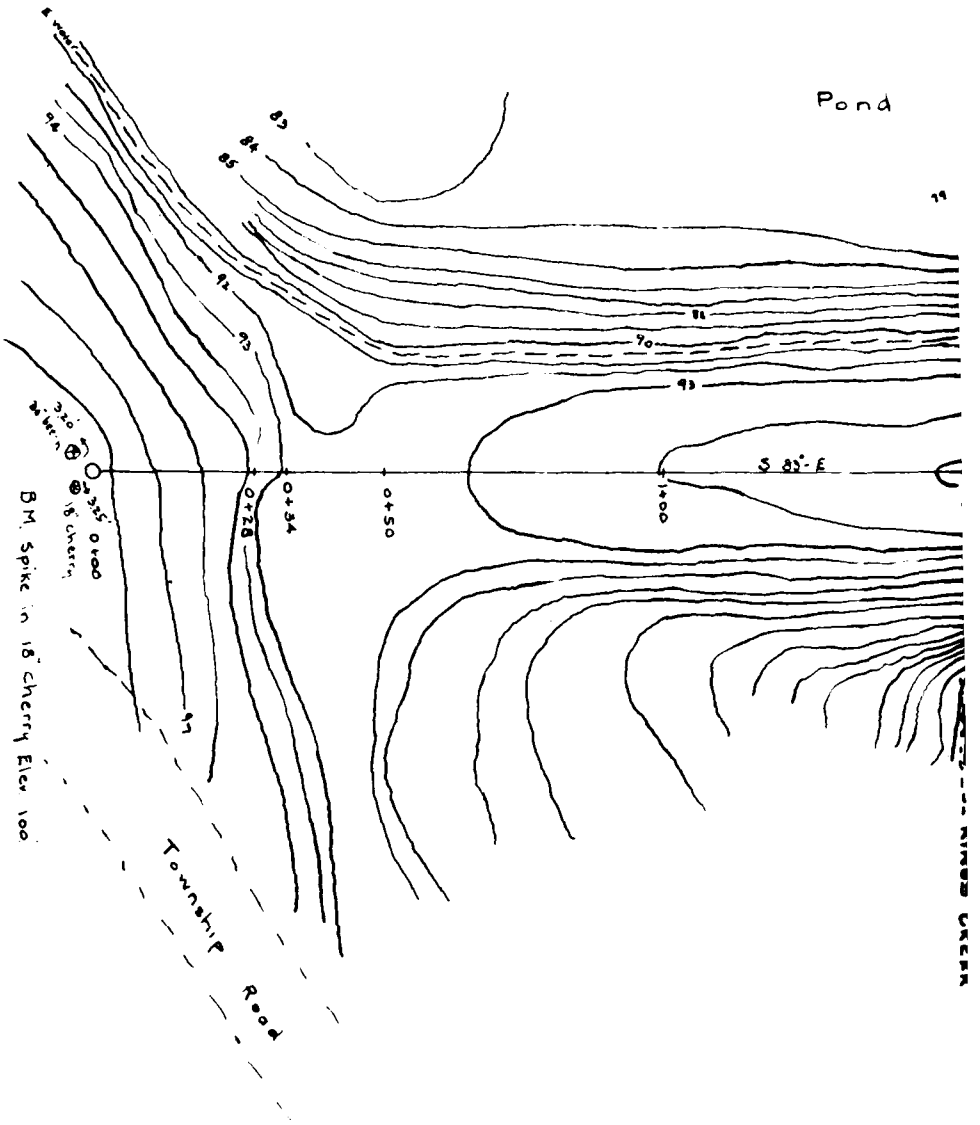


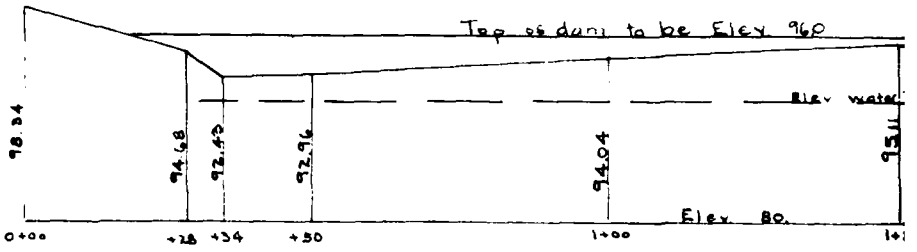
m
parts gravel or crushed stone.

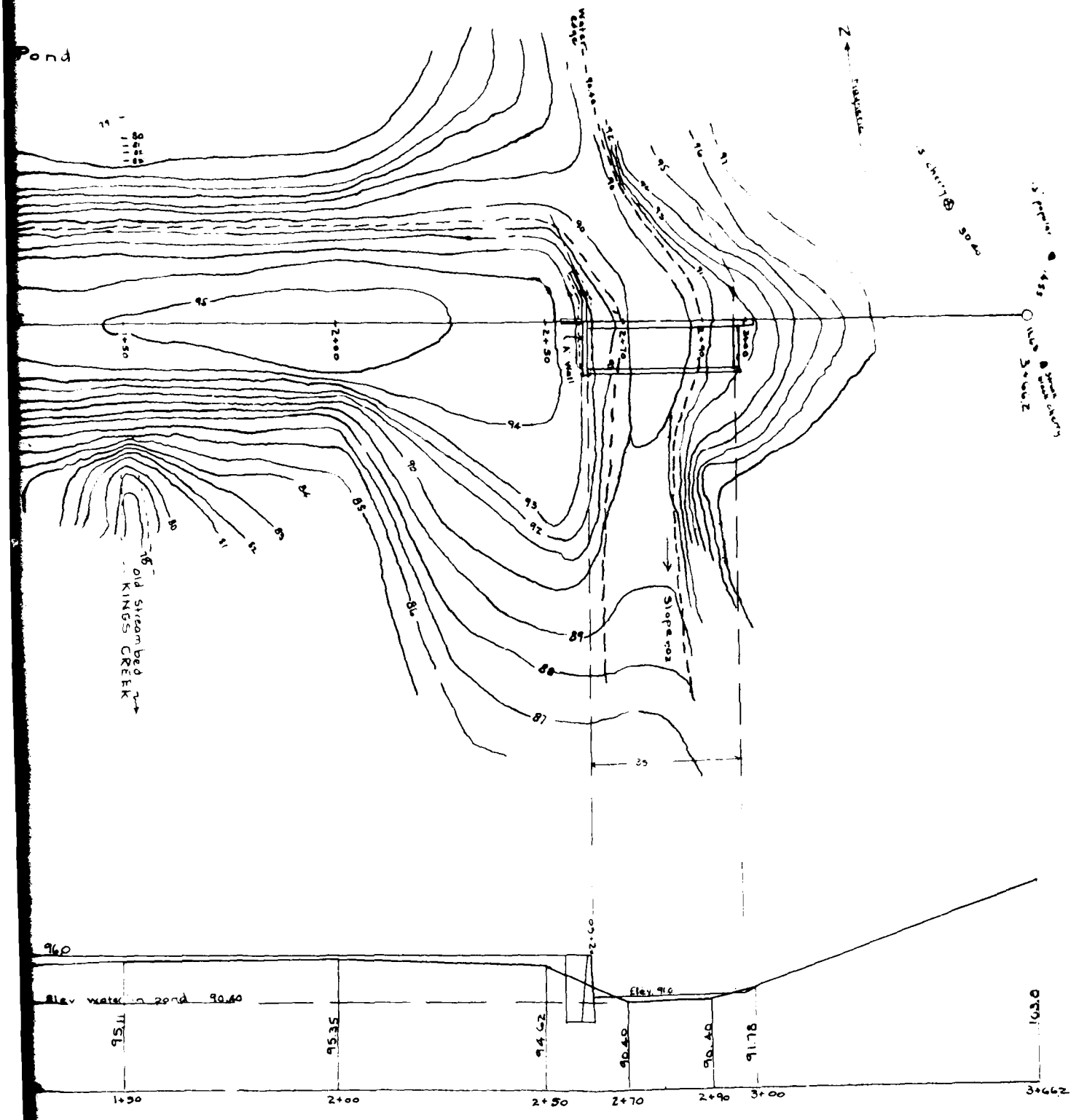
BURGESS DAM

Kings Creek, Elkland Twp. Sullivan Co. Pa

Roscoe Burgess, owner Scale — 1/2" = 1' Spillway details by J.S. Ritchey 1/4/50


Pond
83
84
85
86
88
90
93
S 85° E
0+00
0+28
0+34
0+50
1+00
320°
335°
18" cherry
BM. Spike in 18" cherry Elev 100
Township Road


Top of dam to be Elev 960
Elev water
98.24
94.68
92.43
92.96
94.04
Elev 80.
0+00
+28
+34
+50
1+00



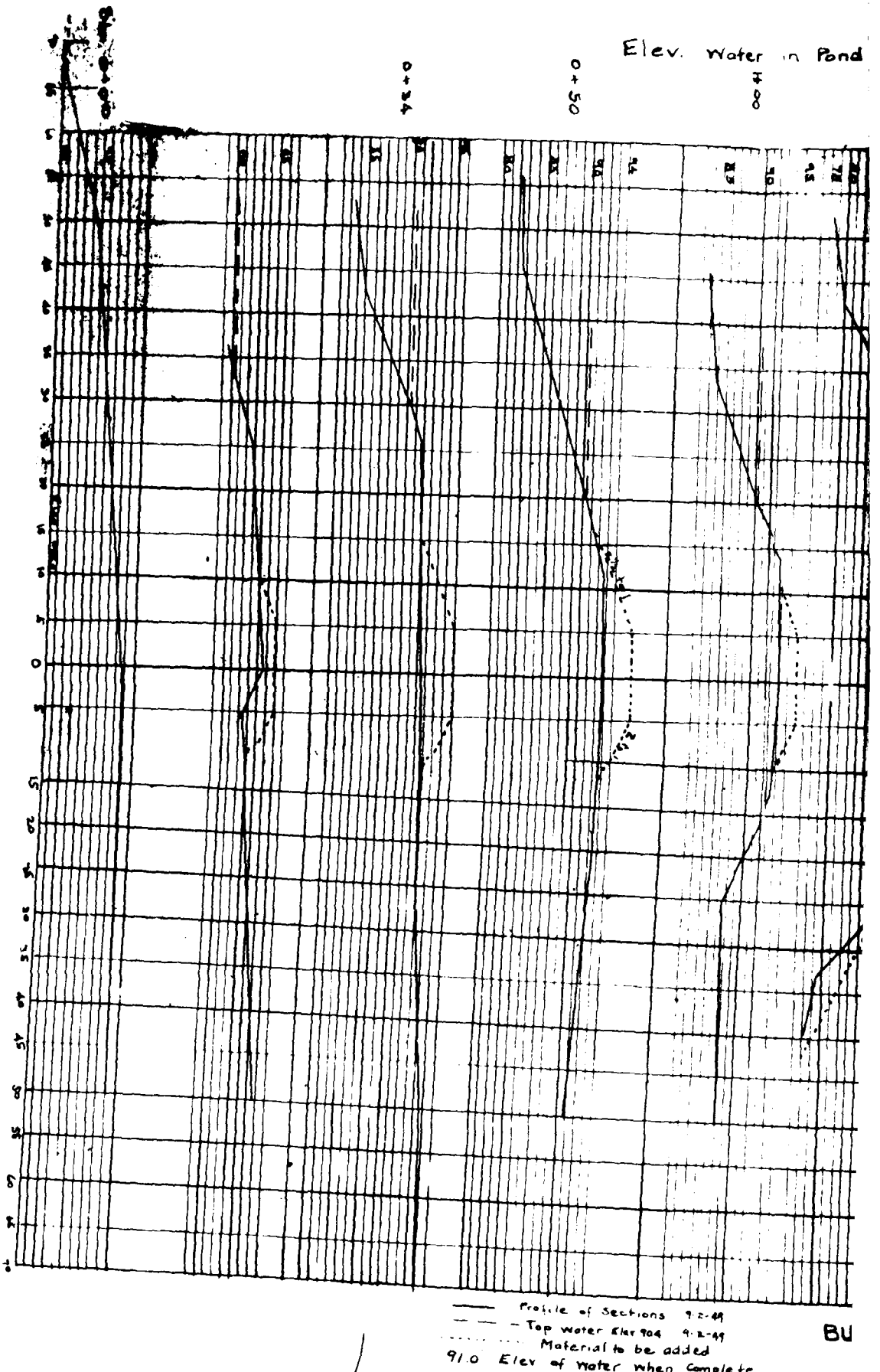
BURGESS DAM

Kings Creek, Elkland Twp Sullivan Co., Pa.

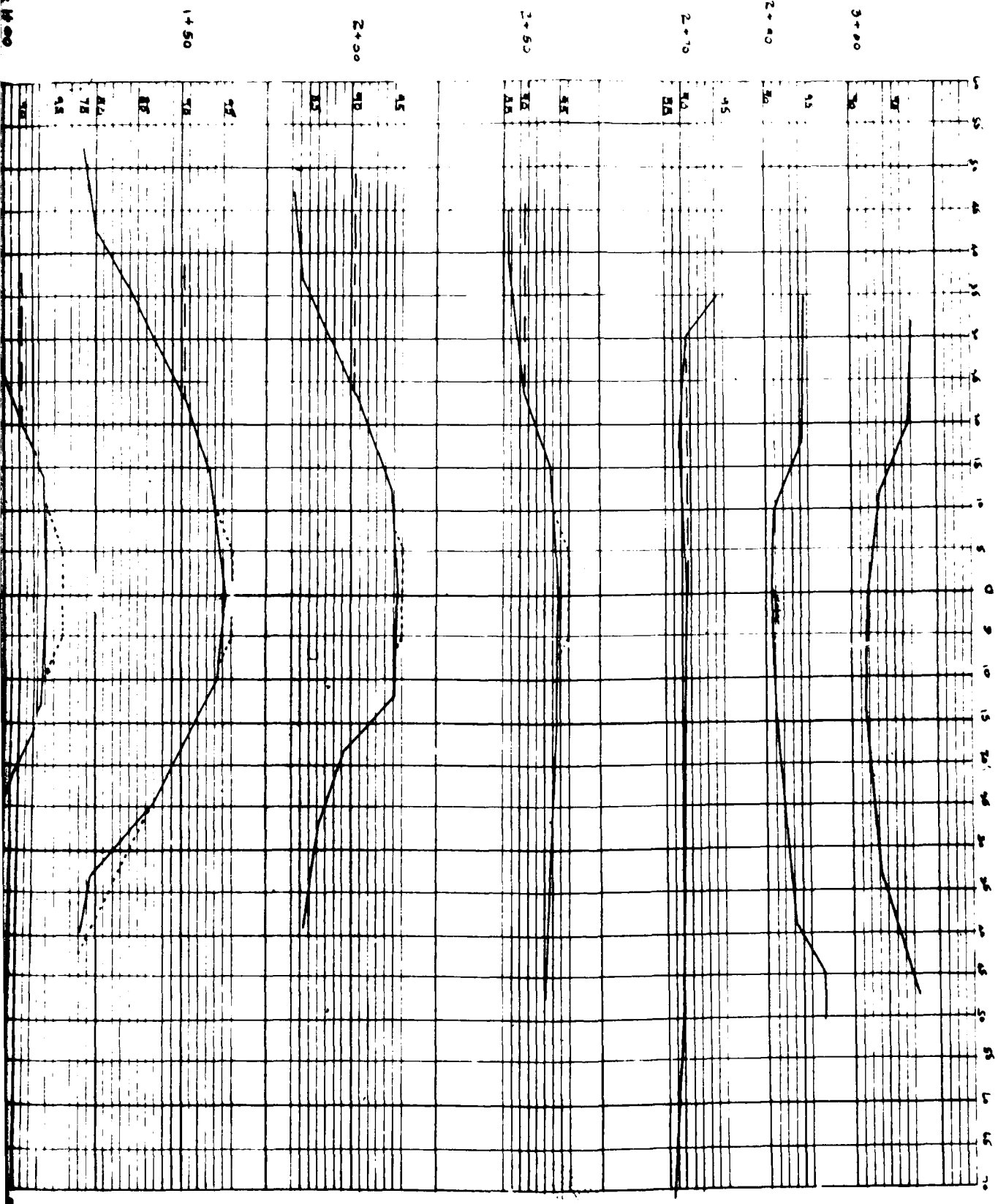
Surveyed Sept. 2. 1949 by J & Ritchey

Hor. Scale - 1" = 20' Vert Scale - 1" = 10'

E 3


Elev. Water in Pond
4+00
0+50
0+00
Profile of Sections 9-2-69
Top Water Elev 904 9-2-69
Material to be added
91.0 Elev of Water when Complete

in Pond 904'

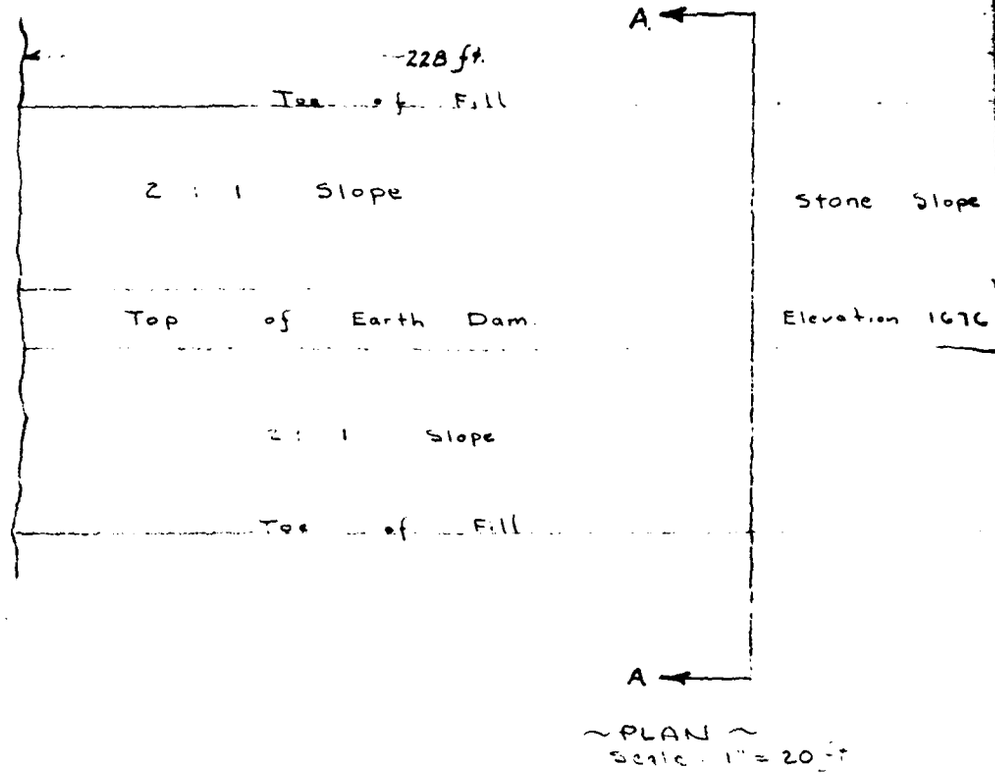


BURGESS DAM X-Sections

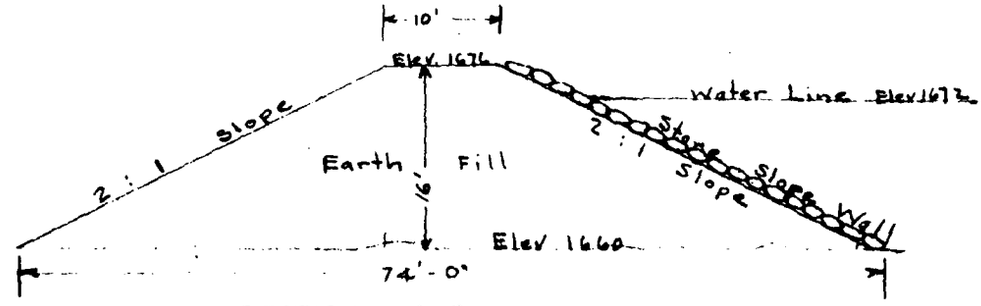
Taken 9-2-1949 by [illegible]

Scale — 1" = 10'

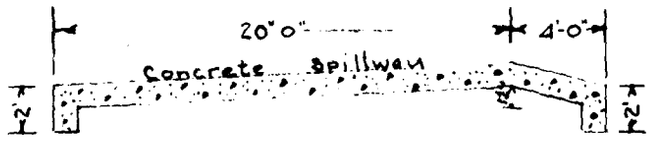
E 4



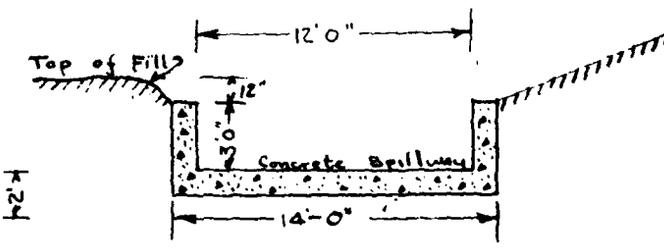
~PLAN~
Scale 1" = 20 ft



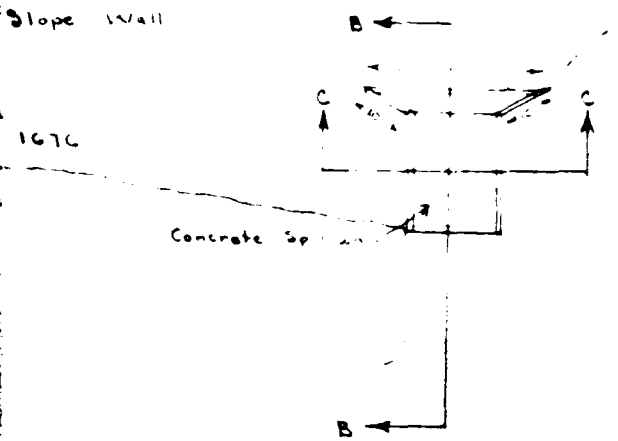
SECTION A-A
Scale 1" = 10 ft.



SECTION B - B
Scale: 1" = 5 ft.

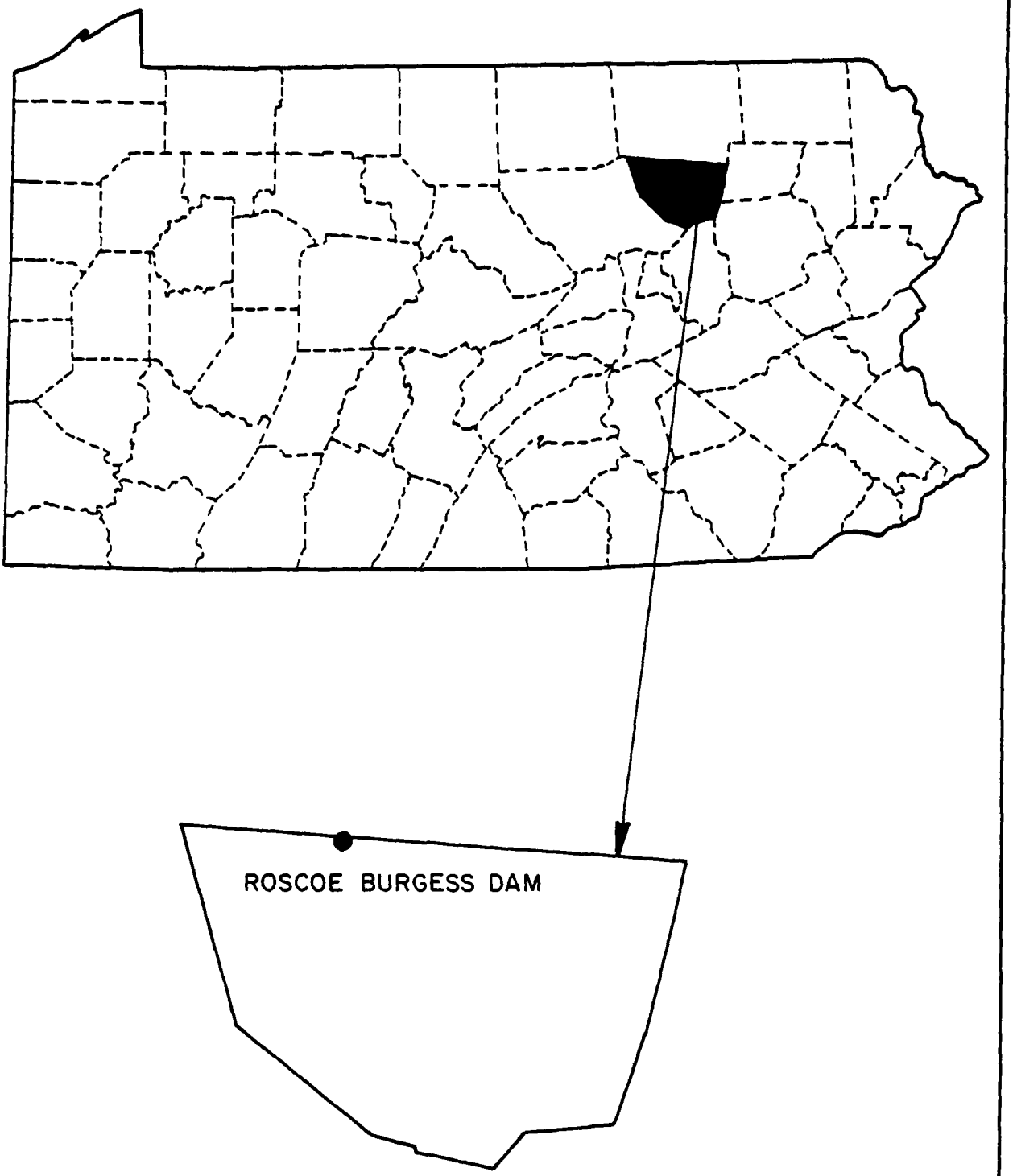


SECTION C-C
Scale: 1" = 5 ft



PLAN OF PROPOSED CONSTRUCTION
OF AN EARTH DAM AND A CONCRETE
SPILLWAY. TO BE CONSTRUCTED
FOR ROSCOE BURGESS.
SITUATED IN ELKLAND TOWNSHIP
SULLIVAN COUNTY, PA.
SCALE AS SHOWN ON PLAN.
SAMUEL R. KIRKLAND
REGISTERED SURVEYOR
LAPORTE, PA. JULY 18, 1949.

2



SITE LOCATION MAP
SULLIVAN COUNTY, PENNSYLVANIA

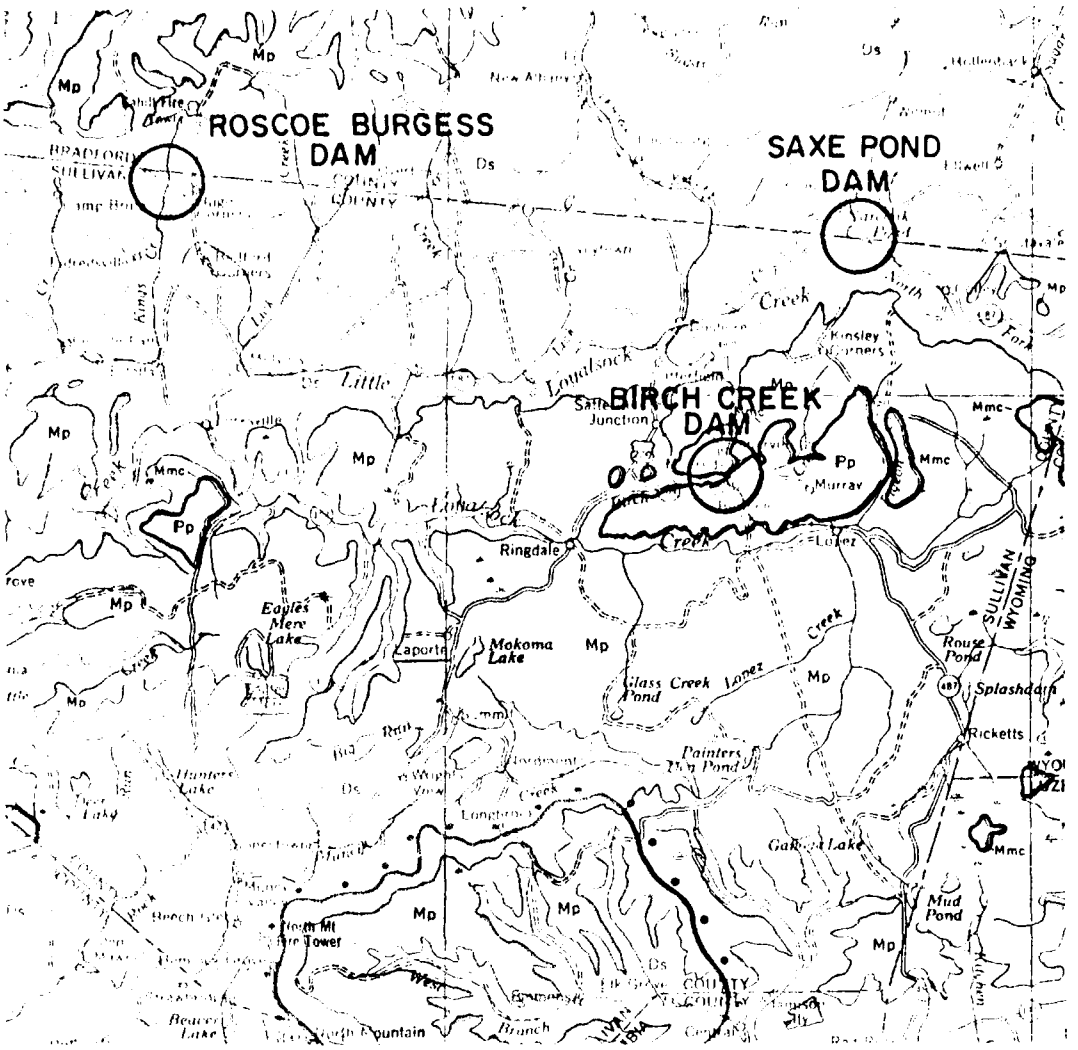
APPENDIX F
GEOLOGY

General Geology

The Roscoe Burgess Dam is located in the (Glaciated) Low Plateaus Section of the Appalachian Plateau Province, near the boundary of the Allegheny High Plateaus Section. The surface is dissected, leaving remanants of what was once the high plateau. The region was covered by the Wisconsin glacier, which has left abundant evidence of its previous existence in the form of many small glacial lakes, marshes, and moraines. Deposits of glacial outwash are the most productive water-bearing materials in the area.

The bedrock underlying the dam consists of sandstones, shales, and graywackes of the Susquehanna Group of Upper Devonian Age. This group is divided into three formations, the Oswayo Formation (youngest), the Catskill Formation, and the Marine Beds (oldest), which include the 'Chemung' and 'Portage' beds. The Roscoe Burgess Dam lies on the Catskill side of the Catskill/Chemung contact.

These strata strike to the northeast and dip to the northwest. This strutural nature is due to the dam being located on a common limb of the Barclay Syncline to the northwest and Wilmot Anticline to the southeast. The geologic structure is typical of the Plateaus province, where the principal folds trend northeast. No major faulting is indicated in the vicinity of the Roscoe Burgess Dam.



GEOLOGIC MAP OF AREA AROUND SAXE POND DAM, ROSCOE BURGESS DAM AND THE BIRCH CREEK DAM

SCALE 1:250,000

PENNSYLVANIAN

Pp — Pocono Formation

MISSISSIPPIAN

Mm — Mauch Chunk Formation

Mp — Pocono Group

DEVONIAN

UPPER

CENTRAL AND EASTERN PENNSYLVANIA

Dcc — Catskill Formation

Red rock and greenish gray rock are mostly of equal importance with rock types and patterns of uneven lenses, or rock of each type predominating in some separate exposures; relation to type Catskill not proved.

Dck — Catskill Formation

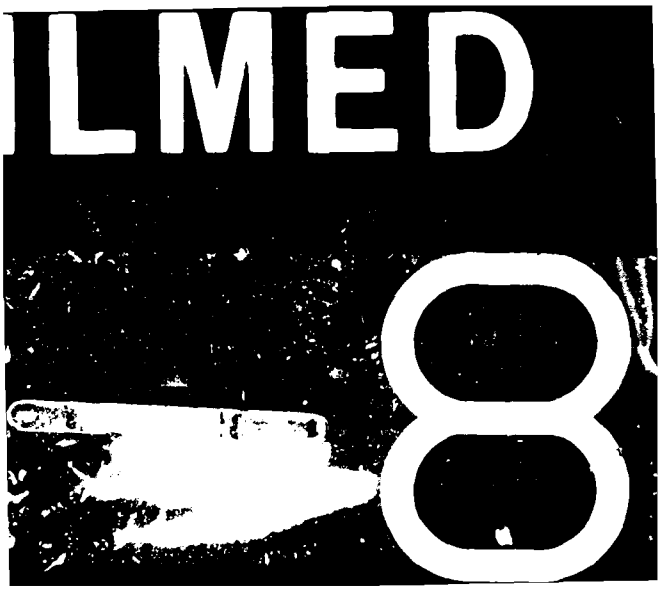
Chiefly red, brownish gray and gray rock types; gray and red rock units are separate names for Mountain Lion Run, Shickshinny and Delaware River rock units.

Dm — Marcellus beds

Gray to olive, brown shales, graywackes in the eastern exposures. Chemung beds of Lackawanna and Wyoming Valleys. Harrell and Trimmers Rock, Tully Limestone at base.

Ds — Susquehanna Group

Dashed line at "Chemung-Catskill" contact of Second Pennsylvania Survey County reports, both on "Chemung" side of line.


LMED
8